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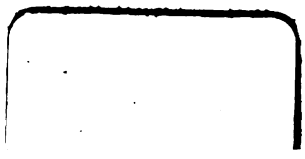

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REPORTS

FROM

COMMITTEES:

TEN VOLUMES.

—(7.)—

METROPOLIS TOLL BRIDGES BILL;
METROPOLITAN FIRE BRIGADE;
NEW FOREST BILL.

Session

8 *February* ——14 *August* 1877.

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VOL. XIV.

1877.

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1877.

TEN VOLUMES:—CONTENTS OF THE

SEVENTH VOLUME.

N. B.—*THE* Figures *at the* beginning of the line, *correspond with the* N° *at the foot of each* Report; *and the* Figures *at the* end of the line, *refer to the* MS. Paging *of the Volumes arranged for The House of Commons.*

METROPOLIS TOLL BRIDGES BILL:

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METROPOLITAN FIRE BRIGADE:

342. Report from the Select Committee on Metropolitan Fire Brigade; together with the Proceedings of the Committee, Minutes of Evidence, Appendix, and Index - - - - - - - 37

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REPORT

FROM THE

SELECT COMMITTEE

ON

METROPOLIS TOLL BRIDGES BILL;

TOGETHER WITH THE

PROCEEDINGS OF THE COMMITTEE,

AND

MINUTES OF EVIDENCE.

Ordered, by The House of Commons, *to be Printed,*
12 *April* 1877.

156.

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Tuesday, 6th March 1877.

Metropolis Toll Bridges Bill.

Ordered, That the Metropolis Toll Bridges Bill be read a second time, and committed to a Select Committee of Eleven Members, Six to be nominated by the House, and Five by the Committee of Selection.

Ordered, That all Petitions against the Bill, presented on or before the eighth day after the Second Reading of the Bill, be referred to the Committee, and all Petitioners entitled to be heard be so by themselves, their Counsel, agents, and witnesses upon their Petitions, if they think fit, and that Counsel be heard in support of the Bill and against the Petitions.

Ordered, That the following Reports of Select Committees of this House, and the Evidence taken before them, be referred to the Committee on the Bill; namely, the Committee of 1865, upon the Metropolitan Toll Bridges Bill and the Chelsea Bridge Toll Abolition Bill; of 1876, upon the Toll-paying Bridges over the Thames, and upon the Metropolis Toll Bridges Bill.

Monday, 12th March 1877.

Ordered, That the Petition of the Albert Bridge Company, against the Bill, be referred to the Committee.

Tuesday, 13th March 1877.

Ordered, That the Petitions against the Bill, from London, and the Deptford Bridge Creek Company, be referred to the Committee.

Wednesday, 14th March 1877.

Ordered, That the Petitions against the Bill, from the Westminster District Board of Works, and the South Eastern Railway Company, be referred to the Committee.

Thursday, 15th March 1877.

Ordered, That the Petition of the Lord Mayor, Aldermen, and Commons of the City of London, presented by the Sheriffs at the Bar, for alteration of the Bill, be referred to the Committee. Counsel ordered.

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Committee nominated of—

Mr. Stansfeld.	Mr. Cubitt.
Sir Charls Russell.	Mr. William Holms.
Sir James M'Garel-Hogg.	Mr. Alderman M'Arthur.

Added by the Committee of Selection (March 16)—

Lord Richard Grosvenor.	Earl Percy.
Mr. Hall.	Mr. Ralli.
Mr. Isaac.	

Ordered, THAT the Committee have power to send for Persons, Papers, and Records.

Ordered, THAT Five be the Quorum of the Committee.

Monday, 9th April 1877.

Ordered, THAT the Petition from Mile End Old Town, against the Bill, be referred to the Committee.

Tuesday, 10th April 1877.

Ordered, THAT the Parties appearing before the Select Committee on the Metropolis Toll Bridges Bill have leave to print the Minutes of the Evidence taken before the Committee, day by day, from the Committee Clerk's Copy, if they think fit.

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REPORT.

THE SELECT COMMITTEE to whom the METROPOLIS TOLL BRIDGES BILL was referred, have examined the allegations of the Bill and found the same to be true, and have taken evidence thereon, which they have agreed to report to the House, and have gone through the Bill, and made Amendments thereunto.

12 *April* 1877.

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PROCEEDINGS OF THE COMMITTEE.

Tuesday, 20*th March* 1877.

MEMBERS PRESENT:

Mr. Stansfeld.	Sir James M'Garel-Hogg.
Mr. William Holms.	Mr. Isaac.
Mr. Cubitt.	Earl Percy.
Mr. Alderman M'Arthur.	Mr. Hall.

Mr. STANSFELD was called to the Chair.

The Committee deliberated.

[Adjourned till Tuesday, 10th April, at Twelve o'clock.

Tuesday, 10*th April* 1877.

MEMBERS PRESENT:

Mr. STANSFELD in the Chair.

Sir James M'Garel-Hogg.	Mr. Hall.
Mr. Cubitt.	Mr. M'Arthur.
Mr. Isaac.	Mr. William Holms.
Lord Percy.	Mr. Ralli.

METROPOLIS TOLL BRIDGES BILL.

Preamble read the first time.

Counsel:—Mr. Cripps, Q.C.; Mr. O'Hara, and Mr. Bazalgette.

Agents:—Messrs. Dyson & Co.

Petitions against the Bill were read from—

1. Albert Bridge Company.

   Counsel:—Mr. Gates, Q.C., and Mr. Bryan Davies.

   Agent:—Messrs. Holmes.

2. Deptford Bridge Creek Company.

   Counsel:—Mr. Maclean.

   Agent:—Mr. Drew.

3. South Eastern Railway Company.

   Agent:—Mr. Stevens.

4. Corporation of the City of London.

   Counsel:—Sir E. Beckett, Q.C., and Mr. Prior Goldney.

   Agent:—Mr. Corrie.

5. Vauxhall Bridge Company.

   Counsel:— Mr. Philips.

   Agent:—Mr. Cripps.

6. Waterloo

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6. Waterloo Bridge Company.

Counsel:—Sir E. Beckett, Q.C., and Mr. Jones.

Agents:—Messrs. Lawless.

7. Lambeth Bridge Company.

Agents:—Messrs. Clabon & Fearon.

Petitions were also read from—
Vestry of St. George's, Hanover-square.
Owners, &c., in Whitechapel.
Westminster District Board of Works.

But no parties appeared in support of the same.

Mr. *Cripps*, Q.C., on behalf of the Promoters, was heard in support of the Preamble of the Bill.

Sir *E. Beckett*, Q.C., on behalf of the Corporation of the City of London, proposed an Amendment to the Preamble by giving the Corporation a joint control with the Metropolitan Board of Works, called—
Mr. *William Cornie* sworn, and examined.

Question That the Preamble is proved—put, and *agreed to*.

Clauses considered.—On Clause 6:

Sir *E. Beckett*, Q.C., on behalf of the Petition of the Waterloo Bridge Company, called—
Mr. *William C. Clarke* sworn, and examined, and was heard to address the Committee, and to propose to strike out all the words from the word "Provided," page 3, line 3, to the end of the Clause.

On behalf of the Petition of the Albert Bridge Company—
Mr. *Ewing Mattheson* sworn, and examined.
Mr. *Gates*, Q.C., was heard to address the Committee.

On behalf of the Petition of the Vauxhall Bridge Company—
Mr. *Edward Wylds* sworn, and examined.
Mr. *Phillips* was heard to address the Committee.

On behalf of the Petition of the Lambeth Bridge Company—
Mr. *Thomas Nettlefold* sworn, and examined.
Mr. *Clabon* was heard to address the Committee.

[Adjourned till To-morrow, at Twelve o'clock.

Wednesday, 12th April 1877.

MEMBERS PRESENT:

Mr. STANSFELD in the Chair.

Sir James M'Garel-Hogg.	Mr. M'Arthur.
Mr. Hall.	Mr. Cubitt.
Earl Percy.	Mr. Ralli.
Mr. Isaac.	Mr. Holms.

Mr. *Aston*, on behalf of the Petition of the Westminster District Board of Works, applied to be allowed to appear.

The Committee refused the application.

Mr. *W. C. Clarke* re-called, and examined.

Mr. *O'Hara* stated the terms of compensation to the Officers of the Bridge Companies, proposed by the Promoters.

Sir *E. Beckett*, Q.C., on behalf of the Waterloo Bridge Company: Mr. *Clabon*, on behalf of the Lambeth Bridge Company, and Mr. *Bryan Davies*, on behalf of the Albert Bridge Company, were severally heard against the proposals.

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Mr. *O'Hara* was heard in reply.

Mr. *Cripps*, Q.C., was heard in reply upon the whole case of Clause 6.

Room cleared.—The Committee deliberated:—On the amendment proposed by the Waterloo Bridge Company.—Question, That the words "Provided that in estimating," Clause 6, page 3, line 3, stand part of the Clause—put, and *agreed to.*

Parties called in, and informed thereof.

Mr. *Gates*, Q.C., on behalf of the Albert Bridge Company; Mr. *Maclean* on behalf of the Deptford Creek Bridge Company; Mr. *Jones* on behalf of the Waterloo Bridge Company, were severally heard to propose Amendments to the Clause.

Room cleared.—The Committee deliberated.

Clause *agreed to*, without Amendment.

Parties called in, and informed thereof.

By leave of the Committee, on behalf of the Albert Bridge Company—

Mr. *Thomas W. Davis* and Mr. *William Thomas Newmarch*, were severally sworn, and examined on the question of the date on which the Bridges should be opened free of toll.

[Adjourned till To-morrow, at Twelve o'clock.

Thursday, 12th April 1877.

MEMBERS PRESENT:

Mr. STANSFELD in the Chair.

Sir James M'Garel-Hogg.	Mr. Holms.
Mr. Isaac.	Sir C. Russell.
Earl Percy.	Mr. M'Arthur.
Mr. Hall.	Mr. Cubitt.
Mr. Ralli.	

On the question of the consideration to be paid for the bridges; Mr. *O'Hara* was heard to state the terms proposed by the Promoters.

Sir *E. Beckett*, Q.C., Mr. *Philips*, Mr. *Maclean*, and Mr. *Gates*, Q.C., were severally heard against the proposals.

Mr. *Jones*, on behalf of the Waterloo Bridge Company, was heard to propose Amendments.

Mr. *O'Hara* was heard in reply.

Room cleared.—The Committee deliberated.

Parties called in and informed that the Committee approved of the terms proposed by the Promoters.

Clause 26.—Mr. *Phillips*, Mr. *Maclean*, Mr. *Bryan Davies*, and Mr. *Jones*, were severally heard, on behalf of the Petitioners, to propose an Amendment to the clause, by adding at the end thereof, the words "and also the costs, charges, and expenses incurred by any Company in reference thereto."

Mr. *O'Hara* was heard against the proposed Amendment.

Room cleared.—The Committee deliberated.

Question, That the proposed words be added to the Clause—put, and *negatived.*

Postponed Clauses considered, and *agreed to.*

Several new Clauses *added.*

New Clause (Compensation to Officers of the Companies) brought up, and read a first time.

Mr. *Maclean*, Mr. *Phillips*, and Mr. *Davis* were severally heard to propose Amendments to the Clause.

Sir

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Sir *E. Beckett*, Q.C., was heard against the Clause.

Mr. *O'Hara* was heard in reply in support of the Clause.

Room cleared.—The Committee deliberated.

Clause read a second time, and amended by inserting the word "messenger" before the words "toll collector," and by striking out "three years," in subsection 3, and inserting "two years," instead thereof.

Clause, as amended, *added.*

Another New Clause, brought up, and read the first time, as follows:—"Having regard to the terms of employment of the principal clerk, and the assistant clerk of the Waterloo Bridge Company, under 'the 49th of George the Third, Chapter 191, Section 26, when the Bridge is purchased, the said principal clerk and assistant clerk shall receive during their respective lives from the Board by way of compensation for the loss of their offices, from the time at which the Board becomes possessed of the Company's Bridge, annuities payable half-yearly, equal to three-fourths of the annual emoluments, derived by them from their respective offices, on the 16th of April 1877,"—(Mr. *Stansfeld*).

Clause read a second time, and *added.*

Parties called in, and informed of the decision of the Committee.

Ordered, To Report the Bill, as amended, together with the Minutes of Evidence, to The House.

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LIST OF WITNESSES.

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MINUTES OF EVIDENCE.

Tuesday, 10th April 1877.

MEMBERS PRESENT:

Mr. Cubitt.	Mr. Isaac.
Mr. Hall.	Mr. Alderman M'Arthur.
Sir James M'Garel Hogg.	Earl Percy.
Mr. William Holms.	Mr. Ralli.

THE RIGHT HONOURABLE JAMES STANSFELD, IN THE CHAIR.

Mr. *Cripps* was heard to open the case for the Bill, and in the course of his address he stated that, unless the opponents desired it, he did not propose to call any witnesses in proof of the Preamble, but the witnesses who had given evidence last year were in attendance and could be produced for cross-examination if any of the opponents desired it. 10 April 1877.

Sir *Edmund Beckett* stated that he did not desire to have any of the witnesses produced.

Sir *Edmund Beckett* addressed the Committee, on the part of the Corporation of London, against the Preamble.

Mr. *William Corrie*, sworn; Examined by Sir *Edmund Beckett*.

Mr. *W. Corrie.*

1. You are the Remembrancer of the City of London?—Yes.
2. Will you state as shortly as you can the constitution and the doings of that body which was appointed in the year 1868?—It is composed of 12 members. Six of them are appointed by the Corporation of London, and six by the Metropolitan Board.
3. What were their powers?—Their powers are set out in the Act of Parliament. To free, first, Kew, Kingston-upon-Thames, Hampton Court, Walton-upon-Thames, and Staines Bridges; and next Chingford Bridge and Tottenham Mills Bridges, upon the River Lee.
4. They were to do that out of what funds?—The Coal and Wine Duties till the year 1889.
5. You cannot tell what those duties would amount to then?—No.
6. They are increasing?—Yes, year by year.
7. How much are they now?—Last year they were 347,000 *l.*
8. Do you know in what ratio they are increasing?—I can scarcely say that. They increase gradually.
9. That committee have gone to work?—That committee has gone to work.
10. They were authorised originally to borrow 150,000 *l.* upon that security?—They were.
11. It was found necessary to extend that amount afterwards?—By 25,000 *l.* in addition.

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Mr. *W. Corrie.*

10 April 1877.

12. Have they freed the bridges?—Yes, except one; they have the funds for the purpose.

13. They have borrowed how much?—They have charged the duties with 330,000 *l.* odd.

14. Three hundred and fifty-three thousand pounds?—Yes.

15. They have borrowed 163,000 *l.*?—They have borrowed 163,000 *l.* for the purpose.

16. Has the committee met with any difficulty from its constitution, or anything else?—No; I believe they have worked very harmoniously together

17. Will you tell the Committee why you are anxious to have that committee continued?—This is the same sort of work that they are already carrying out, and I think it is desirable that they should be continued for this purpose.

18. I see last year the point was taken by somebody that it would be a taxing body, and that people outside the metropolitan area ought to be represented; what do you say to that?—I do not think it is necessary that those parties should elect to the managing body, as I may call it. Parties paying to the police rate are not represented.

19. I see this was put to you last year, "It is not the ordinary case of a taxing body having a discretion to tax, in which case it might be argued that the parties taxed ought to have some control over them?" and you answer, "That is what I mean"?—Yes.

20. There are some minor matters afterwards, but is that all you wish to say upon this point, touching the Preamble?—Touching the formation of the body to carry out the Act.

Cross-examined by Mr. *Cripps*.

21. You were examined before the Committee last year?—Yes.

22. And you had an opportunity of suggesting your views to them about the City at that time?—Yes.

23. It was after that, and after hearing all you had to say, that the Committee reported that the Metropolitan Board was the proper party to have this power?—Just so.

24. Then I think that subsequently to that, when the second Committee sat, you again urged that point to the Committee by your counsel?—We withdrew from that Committee.

25. But you withdrew because, having urged that point before the Committee, the Committee did not take your view?—No; you have the report of what took place; you can read from that.

26. However, you had an opportunity of enforcing this view upon the Committee before the report was made?—Yes.

27. I see, at Question 843, you are asked, "You advocate the reconstitution or continuation of the Kew and other Bridges Committee, which consists of six representatives of the Metropolitan Board and six representatives of the City; in considering the question whether that committee should be continued for carrying out the object now in view, do not you think that area, population, and rateable value ought to enter into the question?" Then you say, "That proportion of representation was agreed on between the two parties when the committee was established"; therefore, what was done at that time was by agreement?—No doubt the two parties agreed on the representation.

28. The Coal and Wine Duties out of which the bridges were to be freed were duties in which you and the Metropolitan Board were both interested?—Yes.

29. Your only argument now is that something of the same kind of work is to be done, and therefore you would like the City to have the same hand in it that they had before?—That is our principal argument, no doubt.

30. You are represented at the Metropolitan Board, are you not?—Not for such a purpose as this, as I have frequently explained to Committees of this House.

31. For all purposes?—No, certainly not.

32. You are represented?—We are represented, no doubt.

33. That is to say in any discussion at the Metropolitan Board on those points in which you can take a part and vote?—Yes.

34. What was the arrangement with reference to the Kew and other bridges when they were freed?—They were to be county bridges.

35. When

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35. When these bridges are freed they remain the property of the Metropolitan Board?—They remain the property of the party carrying out the Act as the Bill is now framed.

36. That is the Metropolitan Board?—Yes.

37. Your office then, so far as the Kew Bridge and other bridges are concerned, was a temporary one; all its duties would cease when the bridges were freed?—No; they will cease in the year 1889, when the money is paid.

38. The duties of the Metropolitan Board will continue for ever?—There is another clause which will have to be considered; that is the money payments to be made by the counties for the purpose of these bridges: a clause will be proposed.

39. That does not affect the question I am putting to you; the Kew and other bridges when freed free also the committee which is carrying out that freeing from having anything further to do with them; they become county bridges?—Yes.

40. These bridges do not pass from the freeing party to the counties, but they remain the property of the parties who have freed them?—We shall propose a clause by which the amount to be paid will be sufficient to keep the bridges in repair; the keeping them in repair would be by the governing body.

41. Is not the distinction this, that in the case of the Kew and other bridges, when they were freed, the freeing body had nothing further to do with them, the bridges passing to the county, whereas under the present scheme these bridges when freed by the Metropolitan Board remain the property of the Metropolitan Board?—They will remain in the body having the conduct of the Act of Parliament.

42. And to be repaired, if necessary, out of their rates?—That would be a question; I should say that they ought to be repaired out of such a sum of money as the counties would pay.

43. The sum of money to be paid by the counties has been already arranged and agreed on?—But that is not binding on the committee.

44. Is one of your objects to disturb that agreement that has been made between the Metropolitan Board and the counties?—Yes.

45. You wish to upset that?—Yes.

Re-examined by Sir *Edmund Beckett.*

46. My learned friend says such-and-such things are to be done by the Bill; you are here complaining of the Bill in its present form?—Yes.

47. If the Metropolitan Board can be authorised to keep possession of, and to repair these bridges, so can you, cannot you?—Yes, certainly.

48. My learned friend says in the former case in 1869, both parties were interested; that is, both you and the Metropolitan Board. I fancy you would be both interested in the taxation now; shall not you?—Yes.

49. The City pays its share of the taxes?—Yes.

50. He says you are represented on the Board; to what extent are you represented?—There are three members from the City,

51. Out of how many?—Out of 45 and the chairman.

52. Can you see any distinction between the case of the other bridges and these, except that the others are further off from you?—They seem to me very much the same.

53. *Chairman.*] That is all you have to bring before us on the Preamble?—

Sir *Edmund Beckett:*] Yes.

The Committee decided that the Preamble was proved.

Clause 5 was read.

Sir *Edmund Beckett* proposed the insertion of the words, "and the Board shall purchase the same," which amendment was agreed to by the Promoters.

On Clause 6—

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Mr. *William Charles Clarke*, sworn; Examined by Sir *Edmund Beckett*.

Mr. *W. C. Clarke.*

10 April 1877.

54. ARE you Chief Clerk to the Waterloo Bridge Company?—I am.

55. I may take it that the figures you gave last year are correct?—Yes.

56. What is the market value of your shares now, or what were they a year ago?—The present market value is 12 *l.* to 13 *l.*

57. Perhaps they have risen in consequence of this Bill?—They have risen for several years.

58. Give us the price for a few years back?—The lowest price was between 2 *l.* and 3 *l.*, that was between 20 and 30 years ago; now they are 12 *l.*

59. What were they a year ago?—Something like 10 *l.* a year ago.

60. Those are the 100 *l.* shares?—Yes.

61. What number of them is there?—Five thousand; not quite 5,000.

62. Four thousand seven hundred and sixty-three?—That is the number.

63. Under your Act what powers have the ordinary shareholders?—They have the ordinary powers.

64. They have the management of the concern?—Yes, and the possession of it.

65. Have the annuitants any share in the management?—None whatever.

66. Or the bondholders?—No.

67. Are there any people except the ordinary shareholders that have any share in the management?—No, none but the shareholders; there are only the ordinary shareholders; there are no preference shareholders.

68. What do the two classes of annuities practically amount to?—To half a million.

69. And the bondholders?—£. 54,000 and some odd figures.

70. What is the present price of the annuities, the 60 *l.* annuities?—The last price of the 60 *l.* annuities was 34 *l.*, and of the 40 *l.* annuities, 30 *l.*

71. Supposing the Bridge Company get any sum of money that is at all likely, and supposing it is wound up as this Bill proposes, would the ordinary shareholders by any possibility get anything?—I think not.

72. As the annuities are a long way from their full value they would sweep off anything in the way of surplus before the ordinary shareholders?—Yes.

73. On what terms are your officers appointed?—Under the Act of Parliament, the Waterloo Bridge Act.

74. This is Clause 26: It shall be lawful for the company of proprietors to suspend or remove any treasurer, engineer, surveyor, clerk, and so on, "or other officer of the company by reason of any negligence, misconduct, or inability;" in short, are your officers appointed under that Act irremovable, except for negligence, misconduct, and inability?—They are irremovable, except on those grounds.

75. There is no clause in the Act bearing upon that, is there?—No.

76. What officers have you at the present time?—Two. I am the chief clerk, and there is an assistant clerk.

77. How long have you been in office?—Twenty-five years in September.

78. How long has the assistant been in office?—Between 19 and 20 years.

79. What is your salary?—My salary is 400*l.* a year, and a house and coals and candles.

80. What is the salary of the assistant?—£. 250 a year.

81. What did the bridge actually cost, 1,100,000 *l.*, was not it?—Yes, a little over a million; 1,054,000 *l.*

82. It is in very good condition, is not it?—It is in first-class condition; as good now as when it was first built.

Cross-examined by Mr. *Cripps*.

83. That condition would, of course you are aware, be taken into consideration by the arbitrator in assessing its value?—Yes, I suppose so. You mean the bridge itself; the state of the structure of the bridge.

84. That would be a proper matter for the arbitrator to take into consideration?—Yes.

85. With

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85. With reference to that point, the better the condition of the bridge the larger your compensation would be in proportion?—I should think so.

86. You would get under this compensation whatever your bridge was worth?—We should get the net tolls, as I understand it under this Bill, and nothing more.

87. What more can your bridge be worth than the net tolls?—If we were to build a bridge like Waterloo Bridge at the present time, with the approaches to it, it would cost two millions of money.

88. What can your property be worth beyond the net tolls to the shareholders?—I would suggest that the present condition of the bridge should be taken into consideration.

89. That is to be taken into consideration?—It appears to me the value of the bridge is what such a structure could be up now for; not as a mere toll-taking concern.

90. Would it add to the value of the undertaking to the shareholders what it could be put up now at?—If the Metropolitan Board wished to build a bridg they would not put up such a bridge as Waterloo Bridge now.

91. Supposing they want to free the existing bridge, what can you take beyond the net tolls as giving value to it; what value is your bridge to anybody beyond the toils?—My view of it is that the value of a bridge is precisely what you could build it for at the present moment.

92. You assume somebody would build it if it was not there?—I assume nothing.

93. *Chairman.*] In your Act have you power to grant compensation or pension to disabled servants or those whom you dismiss without fault?—The practice has been to do so; there is no particular provision with respect of such compensation or pension in the Act; the only clause at all relating to the matter is that which has been read, but it has been the custom to pension all servants.

94. Mr. *Holms.*] Can you give us any instance in which that has been done; and if there have been any such instances, on what proportion has the pension been to the salary which was received before the pension was granted?—One instance which I can give is that of the late assistant clerk, who on becoming ill received a pension; he only received 100 *l.* a year at that time.

95. How long had he been in the service of the company?—Seven or eight years.

96. What had his salary been?—£. 100 at that time.

97. What pension did he get?—£. 30 a year, I think; I am speaking from memory; he had been in the company's service some little time, and he seemed to be a respectable man, and the company took him on as assistant clerk. We had a toll collector who was also pensioned; he met with an accident on the bridge, and his widow had some few shillings a week allowed her, so that the principle of pensioning has always been recognised in our company. Whenever servants have become old and they have required a pension, they have received it. I may mention that without some special clause in this Act of Parliament the officers in our company could receive nothing, because the shareholders have no power to grant them anything, they being themselves liable to the annuitants.

98. Mr. *Cripps.*] Supposing any meritorious servant of the company had to be compensated, or the widow of one of the company's servants, that has all been done out of the net profits of the company of the year?—Yes.

99. Out of the sum which but for that pension would have been divided among those who were entitled to it?—That was the only way in which it could possibly be done; it was paid out of the income of the company.

100. When you have had to give pensions, you have given them out of your net profits?—Yes, it has been out of the general income of the company.

101. That is an obligation upon you by virtue of the clause in the original Act to which reference has been made?—They have been paid out of the revenue of the company, which now the Metropolitan Board propose to take away, giving no compensation.

102. Do the Metropolitan Board propose to give you the net annual value, out of which you can compensate your servants?—No; you propose to take our

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Mr. *W. C. Clarke.*
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income away and to give us nothing but the net tolls; therefore you take the whole advantage of the officers' salaries, and give them nothing in return.

103. There is no other fund at present out of which your officers can be compensated than the net value, is there?— We have paid the pensions from the net revenue, which net revenue you propose to take.

104. It is proposed that the arbitrator should give you the net amount of your interest in respect of your tolls as a substitute for your net revenue at present; if you have to compensate a servant you must compensate him out of your net tolls; you will have to substitute for the net tolls whatever the arbitrator allows in lieu of the net tolls?—It depends on what you call net tolls; in fact, we paid the pensions and so on out of the gross tolls; we paid them out of the income.

105. The net profits are diminished to that extent?—Yes.

106. If you pay a pension to a meritorious servant it will diminish to that extent the amount you receive in lieu of the net tolls?—He would be compensated out of the general income.

107. As to the value of the shares, you say they were 10 *l.* a year ago, but the agitation had begun some time before that with regard to the purchase of the bridges by the Metropolitan Board, or by means of some association formed for the purpose of freeing them?—Yes.

108. Can you tell me what the price of these shares was before the agitation commenced; go back to 1870?—I am speaking from memory.

109. I think I can refresh your memory; when you were examined before the Committee you made this statement, at page 54: "Some years ago the shares were worth 3 *l.*, and now, since the inquiry has taken place, they have gone up to 7 *l.* 10 *s.*, and I should not be surprised to see them up to 10 *l.*"?—They have gone up.

110. Perhaps at the end of another year you would not be surprised to see them up to another 1 *l.*?—They have ranged from 2 *l.* to 15 *l.*

111. Therefore the value of them before this agitation took place was 3 *l.* a share?—No, I say it was 3 *l.* some years ago; not very lately.

112. You say, "Some years ago the shares were worth 3 *l.*, and now, since this inquiry has taken place, they have gone up to 7 *l.* 10 *s.*;" the rise from 3 *l.* has been since the inquiry has taken place. Then you are asked, "All the purchases of late years must have been of a very speculative character," and you say, "There is no doubt that when a knowledge that a Committee of this kind is sitting gets abroad people do speculate a little in the shares;" that is so, is not it?—I daresay that may be so. I do not know what reasons people have for buying the shares, except that they have no power over their own property without the shares; they cannot attend the meetings without the shares.

113. You put it that since the inquiry took place they went up to 7 *l.* 10 *s.*, and you say the shares had been as low as 2 *l.*, and even 1 *l.*; it is 10 *l.* in the print, but I suppose it means 1 *l.*?—They have been from 2 *l.* to 15 *l.*

Re examined by Sir *Edmund Beckett.*

114. Do you know what they were in 1862?—I could not tell you without looking at the books.

115. Your solicitor says 5 *l.* 10 *s.*; do you remember that that was about it?—Possibly it was.

116. I suppose this is by no means the only case in which the value of property rises when there is a prospect of its being dealt with by Parliament. Land very often rises in value when there is a prospect of a railway?—Certainly.

117. The electric telegraph shares rose when there was a prospect of a purchase?—No doubt.

118. Have your revenues been going on increasing since 1870?—Yes.

119. Now about the salaries to officers. I suppose at present the state of things may be represented in this way: the shareholders or annuitants get as their net value, say 100 *l.* In addition to that somebody gets as salary, say 10 *l.* If this Bill is passed all that the company will receive and can receive as the Bill stands would be the 100 *l.*?—Yes.

120. And

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120. And as the Bill further stands they are obliged to divide that 100 *l.* among the shareholders?—Yes.

121. Where is the 10 *l.* to come from?—I do not see.

122. When you have pensioned officers hitherto you have pensioned them because they have retired voluntarily?—Yes, from old age and accident.

123. This is a retirement by compulsion?—Yes.

124. Now about the value. Do you see any reason why this Waterloo Bridge should not be valued just in the same way as a bit of land is valued, or one railway taken by arbitration by another, and so on, without any rule being laid down for the arbitrator?—No, I see no reason.

125. Have you known any other instance where the arbitrator has been directed to take into account the net annual value of a thing in considering the value of it:—No.

126-7. Mr. *Isaac.*] Have you the charge of all the books of the company?—Yes.

128. You know all about them?—Yes.

129. Have any shares been transferred during the last two years?—Yes.

130. At what price?—Varying from 10 *l.* to 12 *l.*

131. Nothing lower?—Yes, they have been done at 7 *l.*

132. Have they been done at 3 *l.*?—Not lately.

133. Not since when?—Not for some time.

134. You knew you were coming here?—Yes.

135. As the person who had charge of the books you did not think it necessary to prepare yourself to answer these questions?—I gave my evidence last year, and I thought that would be sufficient.

136. Do you know of any shares that have been offered at large premiums in consequence of this Bill?—No, not at large premiums, certainly.

137. Can you tell us the amount of compensation at present being paid by the company to old servants?—There are none at present; there is nothing paid now.

Sir *Edmund Beckett*, on the part of the Waterloo Bridge Company, was heard against the Clause.

Mr. *Gates*, on behalf of the Albert Bridge Company, stated that he would proceed to call the chairman of the company before addressing the Committee.

Mr. *Ewing Matheson*, sworn; Examined by Mr. *Gates*.

138. You are Chairman of the Albert Bridge Company?—I am.

139. And under that title, you are the owners of the Albert Bridge proper and the Old Battersea Bridge?—Yes.

140. The Act for Albert Bridge was obtained in 1864, and the works were completed, and the bridge opened, in September 1873?—Yes.

141. By the provisions of that Act of Parliament, I think you were to purchase, and have since become the owners of, the Old Battersea Bridge?—Yes.

142. Are the two bridges now worked by one company as one property?—Yes.

143. Hence the earnings upon these two bridges have gone on increasing since the Albert Bridge was opened?—Yes.

144. Do you keep your accounts of the two bridges together, treating them as one property, or do you treat them separately in your accounts?—We treat them as one property, but we have the details in our books of the earnings of each bridge.

145. But, practically, you treat them as one property?—Yes.

146. By the proviso to Clause 6 of this Bill, it is proposed to purchase this among other bridges, upon the terms of compensating you, due reference being had to the net annual value, as well as to the construction, the present state of repair and liability of such company to maintain, and the probabilities of future increase; referring to the words, "net annual value of the tolls," would that,

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in your judgment, be a fair way of compensating you for the tolls of your property?—Certainly not.

147. Will you tell the Committee why the use of the word "net" there is not a fair way of compensating you in respect of that property?—We think the word "net" is a vague word to begin with, and it might fetter the arbitrator in deciding what was the proper consideration to give us. If it simply means the value of the tolls less the cost of maintaining and lighting and repairing, that is to say, all the expenses that would be put upon the Metropolitan Board, we do not object to that, but if the arbitrator takes into consideration the wages we pay to toll collectors, and matters of that sort with which the purchaser has nothing to do, we should certainly think it very unjust; at any rate we wish to have the opportunity of arguing it before the arbitrator, even if he will not give it to us; and this may, in our opinion, make him refuse to hear us.

148. Under such a Clause as this, the arbitrator may be compelled, before he arrived at the "net," to arrive at the other items of expenditure?—He may do so; we do not know the meaning of "net," therefore we want it struck out or defined.

149. If you strike out the word "net," and still regard the liability to repair and the annual cost of repairs, would it still leave what would be the ordinary net receipt of the tolls?—No; because we have been spending money out of revenue in the past which would not occur in the future; therefore to go by the net annual receipts of the last three years would be very misleading and to our disadvantage.

150. You have spent money out of revenue upon capital account?—Yes; only as a private company we thought it prudent to devote it to revenue.

151. *Chairman.*] The words of the clause are not "net annual receipts"?—The arbitrator may say, "I refuse to hear you."

152. If the words were "net annual receipts," but the words are "net annual value——"

153. Sir *James Hogg.*] How can you get the annual value without going into the whole thing?—The net annual value is the gross receipts, less what we have spent.

154. Mr. *Gates.* It would be open to the arbitrator to take a different view of it, having regard to the net annual value of all these costs?—Yes.

155. Has there recently been a large expenditure upon the old bridge, by throwing two spans into one?—Yes; the Act of Parliament put upon us the obligation of widening the bridge by doubling the width of the spans, and in doing that we at the same time thought we would improve the bridge in other ways, and have been spending 800 *l.* a year out of our revenue to strengthen the bridge, and we have strengthened it so effectually that this year we shall spend only 100 *l.*; therefore our net receipts for the last two years have been lessened in that way, and we do not want the word "net" to be there.

156. You have referred to the fair wear and tear and the necessary repairs to maintain the bridge, but there have been exceptional expenses here, and extra expenditure?—Yes.

157. Which might be deducted by the arbitrator under such words as these?—Yes. I would just add that we see a reference to the Lands Clauses Consolidation Act which we agree to, but we find that in the next paragraph we are disqualified, and do not get the advantage of the Lands Clauses Consolidation Act, and we object to that.

158. You would agree with the suggestion which has been made on behalf of the Waterloo Company, to strike out the proviso altogether?—How far? We do not want to strike out "the probabilities of future profits." I would just observe that our case is very different to that of any other bridge on the Thames, ours being a young bridge, future profits are everything to us; we have no past history to judge by.

159. Under the Lands Clauses Act, the arbitrator would have power to take in any prospective increase?—If you say so, of course it is so.

160. Now as to the date when the annual value is to be taken. It is suggested on behalf of the promoters that the tolls should be taken in respect of the undertaking of such company prior to the 1st day of July 1876?—Yes.

161. You say the tolls upon your property are increasing?—Yes.

162. Do you yourself say that July 1876 should be the date at which that annual value should be taken?—No; we think it a useless and unfair date;

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date; we think it should be the day we go into court to have it arbitrated upon.

163. In point of fact, as late a date as possible before the opening of any neighbouring bridge?—Yes, that is so.

164. Those are all the observations you wish to make upon this proviso?—Yes.

Cross-examined by Mr. *Cripps.*

165. I should like to know what your idea really is about the net value of the tolls; have you anything to divide amongst your shareholders, or which you can give them, save the net value of your tolls?—I do not know what you mean by "net."

166. I mean the amount available for your shareholders after you have paid the expenses of obtaining them?—At present we have no other money to divide.

167. At present what else can you have?—We might choose to collect the tolls ourselves.

168. If you collected the tolls yourselves, do you mean that you and the directors would go upon the bridge?—It is within our rights to do so.

169. You do not suppose anything so extravagant as that some expense must attend the collection of the tolls?—The same expense that a nobleman has in sending round to collect his rents.

170. Never mind the nobleman; some expense there must be in collecting the tolls?—Yes.

171. And the amount to be distributed amongst your shareholders would be less by that expense, whatever it may be?—Yes.

172. Putting that out of the question, what else can there be to distribute amongst your shareholders except the net value of the tolls?—It is a matter of argument.

173. No; I give you, as chairman of the company, the fairest possible opportunity of telling the Committee any other source of revenue you have except the net value of the tolls to divide amongst your shareholders?—We have no other but our tolls.

174. You are interested as a shareholder; now is the interest limited to what the net value of the tolls may be which are to be divided amongst them?—Yes.

175. You complain that in last year you had to throw two spans into one?—Yes.

176. Surely that would be a matter to put before the arbitrator as an exceptional matter?—I do not know what the arbitrator will have in his mind when you instruct him by the word "net."

177. Have you read the words fairly through?—Many times.

178. Do you mean to say that any arbitrator in his senses would not take into consideration that in past years some expense had been incurred by two spans being thrown into one, and that in future years you would not have that expense?—He would be more likely to do so by leaving out the words altogether.

179. Leaving out the words "future profits"?—Leaving out the word "net;" it is for the purchaser to submit that to the arbitrator, and he will give it due weight.

180. What harm do you suggest there is in the word "net"?—We say we are entitled to more.

181. You have just told me that you can only have that which remains after paying your expenses?—That is what we get at the present moment; not what we shall ask the Metropolitan Board of Works to pay us.

182-3. What you ask the Metropolitan Board is what value plus anything you can show to the arbitrator as to the probability of that being larger in future?—You say so; I do not agree to that.

Re-examined by Mr. *Gates.*

184. There has been an exceptional expenditure upon the old Battersea Bridge, has there not?—Yes.

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Mr. *E. Matheson.*

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185. Was that incurred within two years or at all events within three years of the date mentioned in this clause?—Yes.

186. Then before the net value of the tolls for that year could be ascertained, that sum would have to be deducted?—Yes.

Mr. *Gates* was heard to address the Committee with regard to the Albert Bridge Company.

Mr. *Phillips* was heard to address the Committee with regard to Vauxhall Bridge.

Mr. *Edward Wylds*, sworn; Examined by Mr. *Phillips*.

Mr. *E. Wylds.*

187. You are Clerk to the Vauxhall Bridge Company, are you not?—I am.

188. What is your salary now?—At the present time it is 300 *l.* per annum.

189. I must apologise to the Committee for having wrongly stated it; what was your engagement when you went to the company?—

Mr. *Cripps.*] Was it a written one?

Witness.] No, it was not a written one. I left Her Majesty's service. After I had been in the Vauxhall Bridge Company 18 months I retired from the service. The point was questioned whether, if I was called upon to serve again, I would leave or not; and it was so far left in my hands that I retired, and sacrificed all my prospects in Her Majesty's Navy for the Vauxhall Bridge Company, being given to understand that, at the decease of the then secretary, who was pensioned, my salary would be increased. I commenced at 200 *l.*, and in the last eight years it has been increased to 300 *l.*, notwithstanding that he is still alive. If the bridge was bought up, I should be a very great loser, because I cannot return to the service again.

190-1. Is there any provision for superannuation in the Act?—I am not quite sure. I did not come prepared with figures to answer every question with the greatest accuracy, as you might expect. One of the directors was examined last year, and he is not present this morning.

192. If the net annual valuation were taken as the amount of compensation to the shareholders, would not it exclude you from compensation?—It would, as far as I understand it.

193. Are there any of your officers superannuated at the present time?—My predecessor is the only one, except a toll collector.

194. What are they receiving as superannuation?—The secretary receives 175 *l.* per annum.

195. How old is he?—Seventy-nine.

196. What is the age of the other one?—The other one is about seventy-eight years of age; he was a toll collector; he receives a pension of 25 *l.* per annum.

197. Do you know what the increase in the receipts has been during the last year; have they been gradually increasing?—The tolls have been gradually increasing in the last few years.

198. Can you tell the Committee the extent of increase in the last 10 years?—They have been affected by various local causes occasionally.

199. What would be the gross increase or the full increase of the receipts during the last 10 years?—At present they are about 11,500 *l.* during the year.

200. Do you know what they were in 1865?—They were about 10,000 *l.* in 1865.

Cross-examined by Mr. *Cripps.*

201. How long have you been in receipt of the 300 *l.* a year?—A little more than two years.

202. This amount is paid to you out of what would otherwise be the net profits of the company; of course the shareholders of the company get 300 *l.* a year less divided amongst them than if they did not have to pay you the money?—Yes.

203. It is one of the outgoings of the company?—Yes.

204. Therefore

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Mr. *E. Wylds.*

10 April 1877.

204. Therefore their net receipts are 300 *l.* a year less than they would be if they had not to pay you the 300 *l.*?—Yes.

205. Supposing you were paid 300 *l.* by the Company, and they had to pay the net profit to you, they would have to pay the shareholders the net profits of your 300 *l.* in addition?—Yes.

206. At present your payment is a charge upon the net profits?—Yes.

207. And the shareholders get so much less in virtue of that?—Yes.

208. You represent Vauxhall Bridge?—Yes.

209. Do you remember when Lambeth Bridge was opened?—I think it was opened about 20 years ago.

210. That is rather too far back?—I have it on record in the office.

211. You know that the opening of Lambeth Bridge diminished the traffic over Vauxhall Bridge considerably?—Not a very great deal according to the best of my recollection.

212. I am content to take it from you that it diminished the profits of Vauxhall Bridge?—I presume it did.

213. As to the steamboat facilities from the piers, and coming across from Nine Elms to Vauxhall, what do they do; they bring numbers of persons across, do they not?—Yes.

214. Who would otherwise go over Vauxhall Bridge?—Yes.

215. And you have no security against matters of that kind occurring year by year, have you?—No.

Mr. *T. Nettlefold.*

Mr. *Thomas Nettlefold*, sworn; Examined by Mr. *Clabon* as to Lambeth Bridge.

216. You are Collector of Tolls on Lambeth Bridge, are you not?—Yes.

217. How long have you been collector?—This is my 15th year; 15 years next November.

218. You have settled yourself in the neighbourhood?—Quite so.

219. You live close by?—Yes, a few doors from the bridge.

220. What is the sum that you deduct from the weekly collection before you pay it into the bank?—£. 5 10 *s.*

221. Out of the 5 *l.* 10 *s.* you have to pay your assistants?—Yes.

222. Leaving a portion of it for your own labour?—Yes.

223. If you lost it without compensation, it would be a serious thing to you?—Yes, a serious loss.

224. It would be a breaking-up of your establishment?—Quite so.

Mr. *Clabon* was heard to address the Committee on behalf of the Lambeth Bridge Company.

Mr. *Maclean* was heard to address the Committee on behalf of Deptford Creek Bridge Company.

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Wednesday, 11th April 1877.

MEMBERS PRESENT:

Mr. Cubitt.	Mr. Alderman M'Arthur.
Mr. Hall.	Earl Percy.
Sir James M'Garel Hogg.	Mr. Ralli.
Mr. William Holms.	Mr. Stansfeld.
Mr. Isaac.	

THE RIGHT HONOURABLE JAMES STANSFELD, IN THE CHAIR.

Mr. *William Charles Clarke*, re-called; Examined by Sir *Edmund Beckett*.

[Mr. *W. C. Clarke.*
11 April 1877.

225. MY learned friend, Mr. Cripps, asked you yesterday the price of shares for some years past, and you were not able to answer him. I believe that you have now been into it?—Yes, I have taken the month of January for each year for 10 years, and I find the average price, taking the entire number of years, to be 8 *l.* 1 *s.* 3 *d.*

226. Just put in the Paper; give us each year in detail?—In 1868 it was 5 *l.*; in 1869 it was 5 *l.* 15 *s.*; in 1870, 6 *l.* 5 *s.*; in 1871, 5 *l.* 10 *s.*; in 1872, 6 *l.* 12 *s.* 6 *d.*; in 1873, 12 *l.*; in 1874, 8 *l.*; in 1875, 11 *l.* 10 *s.*; in 1876, 7 *l.* 10 *s.*; in 1877, 12 *l.* 10 *s.*

227. I think I caught 12 *l.* in some earlier year?—In 1873.

228. Was there any particular reason for that?—I do not know whether there was anything particular at that time.

Cross-examined by Mr. *O'Hara*.

229. These extracts commence in January 1868?—Yes.

230. Will you have any objection to furnish me with a list of the prices of these shares from January 1858, to January 1868, and also from January 1848 to January 1858, because in your evidence last Session you said that some years ago the shares were worth 3 *l.*, and now, since this inquiry has taken place, they have gone up to 7 *l.* 10 *s.*, and I should not be surprised to see them go up to 10 *l.*?—I suppose I was giving the cost price at that time.

231. I have nothing to say about this list, except that in 1868 the shares were 5 *l.*; could you give me the list from 1858 to 1868, and from 1848 to 1858?—Yes.

232. I shall be much obliged if you will do so?—I will do so.

233. *Chairman.*] How do you get, year by year, at the price of the original shares; do you take the average of the prices of years?—I have taken them for the month of January in each year.

234. Your books record the prices paid upon the transfer?—Yes, those were the transfers. I have taken the first transfer in each year.

235. Do these represent large transactions, or small transactions?—I do not know. They were *bonâ fide* sales, I believe.

236. You cannot answer that question?—No.

237. You do not know the amount of the transactions?—No.

238. Mr. *Cubitt.*] You do not give the average number of shares sold in each year?—No.

239. Mr. *O'Hara.*] You say that you cannot give the average for a year; how do you get the particular figures; are these shares sold only in January?—No, all the year round.

240-1. Will you give me the average of the month of January in the last 20 years?—I cannot give that.

242-3. Can

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242-3. Can you prepare a table like that?—I brought this for your information. Mr. *W. C. Clarke.* 11 April 1877.

244. Can you prepare a return for the last 20 years of the average number of sales and the average price during the month of January, in each of the 20 years?—I am prepared to put myself under counsel. I have given the return which I considered sufficient.

245. Can you or can you not; I have asked you whether you can or not give a return, and I submit that the question ought to be answered?—

Sir *Edmund Beckett* objected to the question.

The *Chairman* stated that it was unnecessary to press the question, inasmuch as it was clear that the information could be afforded.

Mr. *O'Hara* was heard to address the Committee with regard to the compensation to servants of the different companies, and stated that a clause had been prepared carrying out the views expressed by the Chairman at the end of yesterday's proceedings, and that the clause was as follows: "When the Board has acquired absolute control of the undertaking of any company, the Board shall continue to pay any allowance granted by such company before 1st January 1877, by way of pension, to any officer or servant of such company in like manner in every respect as the same was theretofore paid by such company, and the Board shall grant by way of compensation for the abolition of office any allowance to the secretary, clerk, or clerks, or toll collector of such company, subject to the following conditions: 1. That such secretary, clerk, or toll collector shall be in the actual employment of the company immediately before the Board obtains absolute control of such undertaking, and shall have been in such employment for the continuous period of not less than two years previous to the 1st day of January 1877. 2. That the amount of such allowance shall be such as would be payable on retirement to such secretary, clerk, or toll collector under Section 2 of the Superannuation Act, 1859, in the event of his having served in any established office in the permanent Civil Service of the State for the same time as in the service of the company, and if 10 years were added to the number of years he may have served. 3. That in estimating such allowance the amount of the salary and emoluments upon which the same shall be calculated shall be taken on the average of the salary and emoluments actually received during the three years next preceding such 1st day of January 1877 by such secretary, clerk, or toll collector as and for his own use, after deducting therefrom any payments or allowances usually made by him. 4. That no such allowance shall exceed two-thirds of the salary and emoluments upon which the same shall be estimated. Every such allowance shall be payable by two equal half-yearly payments, the first of such payments to be made at the expiration of six months from the date when the Board shall have acquired absolute control of such undertaking. Provided always, that the Board may at any time agree with any person entitled to any allowance under this enactment for the commutation of such allowance."

Sir *Edmund Beckett* was heard against the clause proposed by the Metropolitan Board of Works.

Mr. *Clabon*, on behalf of the Lambeth Bridge Company, proposed the following clause: "Every officer and servant of any company the undertaking of which may be purchased by the Board under the powers of this Act, shall receive during his life from the Board by way of compensation for the loss of office from the time of purchase an annuity payable half-yearly, equal if he shall have been in the service of the company 20 years, to two-thirds of the annual emolument derived by him from his office or place at the passing of this Act; and if he shall have been in such service less than 20 years the said annuity shall be diminished at the rate of one-twentieth for every year less than 20 years during which he has been in such service."

Mr. *Bryan Davies*, on behalf of the Albert Bridge Company, stated that he should be willing to follow Mr. Clabon's clause.

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11 April 1877.

Mr. *Maclean*, on behalf of the Deptford Creek Bridge Company, stated that he was prepared to accept the clause proposed by the Metropolitan Board of Works.

Mr. *O'Hara* was heard in reply.

Mr. *Cripps* was heard to address the Committee upon the point of throwing the bridges open simultaneously in classes.

Mr. *Edwyn Jones* stated that as regards Waterloo Bridge he was prepared to agree to the proposal made by Mr. Cripps.

Mr. *Bryan Davies* stated, that he should protest strongly against the course proposed.

Mr. *Cripps* was heard to address the Committee upon the proviso to Clause 6.

The Committee-room was cleared.

After some time the Counsel and Parties were again called in.

The *Chairman* stated that the Committee had determined to retain the proviso as part of the clause.

Mr. *Edwyn Jones* proposed to omit the word "net" previous to the words "annual value" in the proviso to Clause 6, and to add the following words: "That in addition to the sum to the annuitants and bondholders of the Waterloo Bridge Company, the ordinary shareholders shall be entitled to receive whatever shall be determined by arbitration to be the value of their interest, having regard to the market value of the shares on the day of ."

Mr. *O'Hara* was heard against the alteration of the proviso.

Mr. *Bryan Davies* objected to the word "net," and asked that it might be struck out of the proviso. He also proposed to add the following words to the proviso: "But in ascertaining such net annual value no deduction shall be made from the gross annual receipts of the undertaking for payment in respect of capital expenditure or interest on capital."

Mr. *Phillips* objected to the word "net" in the proviso, and asked that it might be struck out. He proposed the following alteration and addition to the proviso: At page 3, lines 6 and 7, to leave out the words "prior to the 1st day of July 1876," and to insert these words, "at the time when notice requiring the company to sell its undertaking shall have been served upon such company in accordance with this Act, the rights of the mortgagees and other incumbrancers thereof, any privileges, profits, and advantages which but for this Act might have accrued to the proprietors of any such company under their special Acts or any of them."

Mr. *Maclean* proposed the following addition to the proviso at line 10, page 3, after the words, "in relation to the same," "and in the case of the Deptford Creek Bridge to the circumstance that the Deptford Creek Bridge Company are entitled to receive in perpetuity from the London and Greenwich Railway Company such difference as is mentioned in Section 17 of the Act.

Mr. *O'Hara* was heard to address the Committee upon the amendment proposed by Mr. Maclean on behalf of the Deptford Creek Bridge Company.

The Committee-room was cleared.

After some time the Counsel and Parties were again called in.

Chairman.] The Committee have considered the various amendments proposed to the proviso to Clause 6, and they do not see any reason to adopt any of the amendments, and the clause unaltered stands part of the Bill.

Clause 7 was read and agreed to.

Upon Clause 8,

Mr.

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Mr. *Bryan Davies* proposed to strike out from the words "into the Bank of England," down to the words "payment to the same," and to substitute the following words, "to be paid in such manner as shall be required by resolution by the said Company, passed at a general meeting convened for the purpose of passing such resolution." He also proposed to strike out the rest of the section down to line 13 at page 5, and to leave in the words, "And the Board shall not be bound to see to the application, or be answerable for the misapplication or non-application thereof." 11 April 1877.

Mr. *Bryan Davies* supported the amendments proposed by Mr. *Edwyn Jones*.

Mr. *Phillips* also supported the amendments to the Clause.

Mr. *Maclean* also supported the amendments to the Clause.

Mr. *O'Hara* was heard upon the amendments proposed.

After some discussion,

Clause 8 was struck out.

Mr. *Gates* desired to call a witness upon the question of the simultaneous opening of the bridges.

The *Chairman* acceded to the application.

Mr. *Thomas White Davies*, sworn; Examined by Mr. *Gates*.

246. You are the Chairman of the Hammersmith Bridge Company?—I am. Mr. *T. W. Davies.*

247. Are you acquainted with the traffic returns over that bridge?—Yes.

248. Do you know what the effect of the freeing of the Kew Bridge from tolls was?—Yes.

249. When was Kew Bridge freed from tolls?—Four or five years ago.

250. Tell us what distance Kew Bridge is from Hammersmith Bridge?—By the Hammersmith road, between two and three miles, and on the Surrey side perhaps two miles.

251. Now tell us what is your experience of the effect of the tolls upon Hammersmith Bridge by throwing Kew Bridge open?—The first year Kew Bridge was opened our tolls were less by 300 *l.* or 400 *l.*; it commenced the day it opened to lessen our receipts; and for that year, to the best of my recollection, it was between 300 *l.* and 400 *l.* less.

252. About how much are your receipts a year at Hammersmith?—I do not know, but the returns have been made.

253. They were affected to the extent of 300 *l.* a year?—Yes, from 300 *l.* to 400 *l.* a year.

254. Do you know the bridges I represent, the Albert Bridge and the Old Battersea Bridge?—Yes.

255. In your judgment, being acquainted with these things, would the freeing from toll of the Chelsea Suspension Bridge and of Vauxhall Bridge prejudicially affect, and very seriously affect, the tolls over the Albert and Old Battersea Bridges?—I have no doubt that it would very seriously affect them.

256. Would taking the tolls off Putney Bridge affect Hammersmith Bridge?—No doubt of it; the West End people go that way.

Cross-examined by Mr. *Bazalgette*.

257. But it was open last year, was it not?—Yes.

258. And yet your takings for the year 1876 were higher than they have ever been before?—Yes, we have been increasing in our tolls the last three or four years, and now the tolls are more than they were previously to the opening of Kew Bridge.

259. Notwithstanding that Kew Bridge is opened, your tolls for 1876 show an increase over the tolls for any previous year?—Materially; we are building largely on the side of Barnes.

260. What is it which induces the belief in your mind that the falling off

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Mr. *T. W. Davies.*

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of 200 *l.* or 300 *l.* a year in the receipts can be remarked to Kew Bridge?—We took special notice of the carriages that went over the bridge, and the one-horse carriages, such as light carts or one-horse carriages, which pay us best, they being 4 *d.* tolls, and the other, two-horse carriages, 3 *d.*; we found that they took a great deal of that traffic away.

261. Have you got any statistics which show that falling off?—Yes, I have sent them to the Metropolitan Board of Works; the accountant asked me to send my statement of accounts for the last three or four years, and I did so immediately.

262. Have you sent any particulars showing what the tolls were before the opening of Kew Bridge?—It is all in the Blue Book, the taking of our tolls for 20 years.

263. In what year was Kew Bridge opened?—Some of the gentlemen here know better than I do; I think it is four years ago.

264. Are not those particulars of tolls that you have sent to the Metropolitan Board of Works since 1872?—Yes; but you have the returns for 20 years, I believe.

265. You cannot remember the exact date when Kew Bridge was opened?—I think four years ago.

266. I understand you to suggest that, if Chelsea and Vauxhall Bridges are opened, the toll takings upon Albert and Old Battersea Bridges would be seriously affected?—Yes.

267. Having reference to their position on the map, can you suppose traffic, in the event of Chelsea and Vauxhall Bridges being opened, would find its way over Chelsea and Vauxhall Bridges, instead of Battersea and Albert Bridges?—I do not know much of Albert Bridge.

268. First assume that the Chelsea Bridge is opened; can you tell me what course traffic leaving the Albert Bridge would have to take, supposing it wanted to avoid Albert Bridge and pass over Chelsea Bridge?—It would take a great deal of traffic going over to Battersea Park.

269. Tell me in point of distance what it is?—I have not come prepared with that.

270. Do not you think that the amount of detour or distance would have a serious effect upon the question whether the traffic would go that way or not?—No; from my experience of Hammersmith Bridge, people have gone two or three miles out of their way to save the 4 *d.* toll.

271. There must be a limit to that?—Yes, certainly.

272. You do not suggest that, for the purpose of saving the toll, a carriage would make a 10-mile detour?—No; but I can name gentlemen living in Richmond and Sheen who, to save the toll on Hammersmith Bridge, which is nearer to them, go over Kew Bridge. I know gentlemen keeping their carriages and pair who do so.

273. You come here and suggest that the effect of the opening of Chelsea Bridge would be to seriously affect the traffic going over Albert and Battersea Bridges; have you gone into the questions of distances and traffic?—I have only done it from my experience of Hammersmith Bridge. I know they would go out of their way two miles to save the tolls, but the bridges here are within half a mile of each other, and they would go over Chelsea Bridge if they could go free, to get to Battersea Park.

274. You cannot explain it in any other way?—No; I did not come here to give evidence at all.

Re-examined by Mr. *Gates.*

275. Though you are not prepared with particulars, have you any doubt about the opening of one bridge free affecting the tolls of a bridge a few miles off?—I have no doubt of it.

276. You told us that the tolls upon Hammersmith Bridge were diminished by the opening of Kew Bridge, but, notwithstanding that, they have since increased?—Yes.

277. Would they have increased considerably more if Kew Bridge had not been opened toll free?—I have no doubt that we have lost 300 *l.* a year by it, but ours is an increasing bridge; from a 25 *s.* dividend we got up to 55 *s.* within 10 years.

278. So

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278. So that a loss of between 300 *l.* and 400 *l.* was the first year's effect of the opening of the Kew Bridge?—Yes. Mr. *T. W. Davies.* 11 April 1877.

279. Since that, you have had a natural increase of traffic, but not to such an extent that in your judgment you would have had?—No.

280. You have been asked as to the way people avoid the tolls, but do you know whether carmen and others who drive their masters' carts go out of their way to evade the tolls, and put the toll-money into their pockets?—I do not know anything about that. I hope they are not so dishonest in our neighbourhood.

281. Whether from one motive or another they do go round?—There is no doubt of it.

Mr. *William Thomas Newmarch*, sworn; Examined by Mr. *Gates.*

282. Are you one of the Directors of the Albert Bridge Company?—I am. Mr. *W. T. Newmarch.*

283. I believe you reside on Clapham Common?—I have resided there for a number of years.

284. With regard to the traffic over the Albert Bridge, the houses on both sides were not numerous when the bridge was built?—In the immediate neighbourhood of the Surrey end of the bridge the houses were not numerous when it was opened, nor are they very numerous at present, but they are increasing every month; a large number are in course of construction.

285. Has there been land on the southern side, near Albert Bridge, recently let on building leases?—A considerable number of plots.

286. So far as the profitable returns of the Albert Bridge Company are concerned, you look for a prospective increase and not for an immediate present return?—Undoubtedly, and there are a number of houses now building on the Albert-road facing Battersea Park; that is the road approaching the bridge on the Surrey side; and we calculate that each house as it is occupied is worth 25 *l.* a year to the bridge. Mr. Maskelyne, the conjuror, has gone to live there lately; he is worth more, because he carries his mechanical image Psycho over the bridge with him three or four times a day in a carriage with a pair of horses.

287. He is a very good neighbour for the Bridge Company to have?—Most excellent.

288. You have some experience about the effect of the opening of Chelsea Suspension Bridge on Sundays and Bank Holidays?—A very disagreeable experience. The Government bridge was opened by the Government on the four Bank holidays under Sir John Lubbock's Act, as we consider most unjustifiably, and we suffered a confiscation of tolls to the extent of 20 *l.* upon each occasion, and we are undoubtedly entitled to claim that in being bought up.

289. Four days at 20 *l.* each?—Yes, four holidays, namely, Easter Monday, Whit-Monday, the first Monday in August, and Boxing-day.

290. What is the distance of the Albert Bridge from the Government Bridge?—The whole length of Battersea Park, half a mile.

291. Do you know whether or not traffic does go round to evade the toll, though it may be a small toll?—Yes, we have considerable experience on that point also, because the toll on the Old Battersea Bridge is practically double what it is on the Albert Bridge, and since that has been the case a considerable amount of the traffic is carried on to the Albert Bridge, and away from the Old Battersea Bridge. Of course that is not material, as they both belong to the same Company, but that is the fact, as shown by the returns.

292. Have you formed an opinion as to what would be the effect upon the Albert Bridge Company by the opening of the Government bridge free altogether?—It would be absolute ruination. From the position of the roads on the south side of the river, and now that Battersea Park has a carriage road through it, the traffic would naturally, to save the toll, all go over the Government bridge; in point of fact we have found considerable detriment arising from the indifferent condition of one of the roads. The mere fact of the road being in indifferent order has induced some of the carriage traffic from Clapham Common and Wandsworth Common, and that neighbourhood, where the residents usually keep carriages and horses, to take their carriages over the Government bridge.

293. Instead of going by the nearest route over the Albert Bridge?—Yes, or

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Mr. *W. T. Newmarch.*

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over Battersea Bridge; in fact we have found that some of the traffic going to South Kensington, and so to Albert Hall, goes that way; that we can tell, because we know when the concerts take place the people attending them will go round by the Government bridge, and come back again, instead of going by absolutely a straight line over Battersea Bridge.

294. That is if the parish road is out of order?—Yes, as it is at present.

295. If you had to keep your bridges open after the Government bridge and Vauxhall Bridge were free, do you think that you could do it without a serious loss?—It would be a most serious loss. Vauxhall Bridge would affect us with the railway traffic to the Northern railways, the traffic to Euston, King's Cross, and St. Pancras; the traffic now generally goes across the Government bridge, or one of the others, in accordance with where it exactly comes from on the south side of the river, which takes a great bend near Wandsworth, and they pay toll on some one of the bridges; if Vauxhall Bridge were free they would go by the South Lambeth Road, over Vauxhall Bridge, and then through St. James' Park, and up by Pall Mall, and so on.

296. Just look at Wandsworth Bridge and tell us what distance Wandsworth Bridge is from Old Battersea Bridge, and your Albert Bridge?—You see by the scale on the map it is about double the distance, about a mile.

297. They got their power under an Act of Parliament a few years ago?—Yes.

298. Were they opposed by your Company, or did they make terms with you?—They offered, without much discussion, to pay 100 *l.* a-year for the damage they would do to the tolls.

299. When they were in Parliament they offered to give you an annuity of 100 *l.* a-year?—That arrangement was made. I had not to do with the arrangement myself, and I do not know the circumstances; but I know that 100 *l.* a-year is the amount that they have to contribute annually.

300. As compensation for the tolls they would abstract from your bridge?—Yes.

Cross-examined by Mr. *Bazalgette.*

301. With regard to the loss of 20 *l.* a-day, which you say you experienced from the opening of Chelsea Suspension Bridge on Bank holidays, how have you ascertained that you experienced that loss?—By the comparative toll-takings upon those particular days; instead of there being a considerable increase, there is none at all; in point of fact the first year I think there was a decrease of 7 *l.* upon that day.

302. Do you take less tolls upon Sundays than on other days?—No, more; and we should take still more if the Government bridge were not free.

303. Would that be due to the particular line the traffic would take on a Bank Holiday?—A great number of foot passengers from Pimlico who go to enjoy Battersea Park are induced to go over Chelsea Bridge, because it is free, who would divide their favours equally or accidentally between the two.

304. What particular bridges would materially affect you, if they were open to the public before yours?—The one that would affect us most materially would be the Government bridge, that is the Chelsea Suspension Bridge, and after that any of the other bridges lower down the river, and to a small extent, Putney higher up the river.

305. You would not be affected to the same extent by Wandsworth Bridge being opened as by Chelsea Bridge being opened?—Wandsworth Bridge is impracticable; the road on the Middlesex side is almost impassable.

306. I may take it that, as far as Putney is concerned, that is out of distance?—No, it is not out of distance; the effect would not be so material as the distance from Battersea to Putney is considerable.

307. Do you seriously represent to the Committee that, supposing Putney Bridge was thrown open before your bridge, your bridge would feel it?—Undoubtedly Old Battersea Bridge would.

308. Would the Albert Bridge feel it?—No, because the Albert and Battersea Bridges go all in one, and the line of traffic is rather different.

309. I suppose I may take it that the thing which materially affects your bridges would be the competition between the Government bridge and the Albert and Battersea bridges?—It would be a most serious matter; it would be absolute ruination.

310. *Chairman.*]

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310. *Chairman.*] Did I understand you to say that 100 *l.* a year, which you receive from the Wandsworth Bridge Company, is paid to you as the estimated loss to your bridge in consequence of making their bridge?—Yes, to Old Battersea Bridge, in consequence of the supposed reduction in the tolls.

311. For that reason only?—Yes.

312. I thought you said that you were not entirely aware of the circumstances under which the payment was made?—I am not aware of any other ground on which it would be paid.

313. Mr. *M'Arthur.*] What is the distance between Wandsworth Bridge and Old Battersea Bridge?—A mile on the north side of the river, and it curves less on the other, but the roads on the south side of the river are very awkwardly laid out; they were laid out long before the bridge was in existence, and they do not run along the bank; you have to go inland to get round, so that the practical distance is further on the south side.

314. *Chairman.*] But you never suffered anything approaching 100 *l.* a year loss from the opening of Wandsworth Bridge?—I do not know that we have, but I am not able to say; the reason we have not suffered so much detriment is that the road from Fulham to the north end of the bridge is quite impassable at this moment.

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Thursday, 12*th April* 1877.

MEMBERS PRESENT:

Mr. Cubitt.
Mr. Hall.
Sir James M'Garel Hogg.
Mr. William Holms.
Mr. Isaac.
Mr. Alderman M'Arthur.
Earl Percy.
Mr. Charles Russell.
Mr. Ralli.

THE RIGHT HONOURABLE JAMES STANSFELD, IN THE CHAIR.

12 April 1877.

Mr. *O'Hara* proposed the following clause in substitution of Clause 8, negatived by the Committee yesterday: "The amount of the consideration to be paid by the Board for the purchase of the undertaking of any company included in Part I. of the Schedule to the Act annexed, when agreed upon or so ascertained as aforesaid, shall, in the case of the undertaking of the Chelsea Suspension Bridge, be paid to such of the directors of such company, or to such other person or persons as such company shall, by a resolution passed at a general meeting of such company prescribe, upon their receipt, except where such directors or persons shall refuse to accept the same, or where no such resolution has been passed, and in such case the same shall be paid into the Bank of England in the name and with the privity of Her Majesty's Paymaster General, and shall be placed to his account there to the credit of such company, subject to the provisions of this Act, and shall be assets of such company to be paid to the order of such directors of the company or other persons as the company shall prescribe, by a resolution passed at a general meeting of such company, to be held subsequently to and within six months after the payment of such consideration into the Bank of England as aforesaid, and upon such payment being made by the Board the said directors or persons, or the cashier of the said Bank shall give to the Board, or to the party paying in such money by their direction, a receipt for such money signed by them on him specifying therein for what purpose and to whose credit the same has been paid, and such receipt shall be a sufficient discharge to the Board for the same, and the Board shall not be bound to see to the application, or be answerable for the misapplication or non-application thereof. The directors, or persons to whom any such consideration shall be paid as aforesaid, shall hold such consideration upon trust to pay and satisfy all debts and liabilities of such company, according to their respective priorities, and to distribute the balance remaining after such payment and satisfaction among the holders of the share capital of the company, their executors, administrators, successors, or assigns, rateably according to their respective priorities, and such directors, or persons, may exercise all powers necessary for distributing such consideration as aforesaid, and for winding up the affairs of such company, or for continuing any part of their business which they may be capable of continuing, according as such company shall by any such resolution as aforesaid determine that their affairs should be wound-up, or that such part of their business should be carried on: Provided that where such directors, or other persons, are for twelve months after the payment to them of such consideration unable after diligent inquiry to ascertain the person to whom any part of such consideration is payable, or where any part thereof is payable to a person who or whose committee cannot give an effectual receipt for the same, the directors may pay the same into the Chancery Division of the High Court of Justice, under

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under any Act for the time being in force for the relief of trustees. In case such consideration shall be paid into the Bank of England in manner aforesaid, and in case such company shall not, within such period of six months thereafter, have passed any such resolution as aforesaid, then, upon petition presented within the period of one month after the expiration of such time by any creditor or creditors, contributory or contributories of such company, or by all or any of the above parties, together or separately, the Chancery Division of the High Court of Justice, shall order such company to be wound up; and thereupon the following provisions of the Companies Act 1862, that is to say Part IV. with respect to the winding up of companies and associations under the said Act, and Part VIII. application of Act to unregistered companies, shall extend and apply to the winding up of such company, shall, in every respect, be a winding up of a company within the meaning and subject to the provisions of the Companies Act, 1862. In case such company shall be wound up in manner aforesaid, the monies forming the assets of such company in the Bank of England shall be paid out to the order of the official liquidator or official liquidators, and shall be by him or them distributed according to the provisions of the Companies Act, 1862."

Sir *Edmund Beckett* was heard against the latter part of the clause.

Mr. *Phillips*, Mr. *Maclean*, and Mr. *Gates* were heard against the clause.

Mr. *Jones* proposed the following rider in substitution of the latter part of the clause: "The provisions of the Companies Act, 1862 and 1867, with regard to winding up, shall not apply to any companies affected by this Act. And the Board shall pay all costs, charges, and expenses properly incurred by any company, in, and about, and incidental to, the settlement and winding up of the affairs of the companies hereby severally appointed.

Mr. *Gates* and Mr. *Phillips* also asked that the rider read by Mr. Jones should be inserted.

Mr. *Maclean* proposed words to the effect that, in the event of the companies not passing resolutions authorising certain persons to receive the money, the Board, within a specified period, should pay the money into the Court of Chancery, under the provisions of the Trustees Relief Act.

Mr. *O'Hara* was heard in reply in support of the substituted clause, as proposed by the Metropolitan Board.

The Committee-room was cleared.

After some time the Counsel and parties were called in and informed that the Committee approved of the clause as proposed by the Metropolitan Board without addition or alteration.

Mr. *Jones* proposed the following addition to the clause, that the provisions of the Companies Acts, 1862 and 1867, with regard to winding up, shall not, except in the event of and subject to the provisions hereinbefore mentioned, apply to any of the companies affected by this Act.

Mr. *OHara* objected to the proposed addition.

Mr. *Maclean* proposed as a verbal amendment that after the words in the first part of the clause, "and in such case the same shall be paid into the Bank of England in the name and with the privity of Her Majesty's Paymaster General," the following alteration should be made, "and with the privity of Her Majesty's Paymaster General of the Chancery Division of the High Court of Justice, and shall be placed to his account there to the credit of such company, *ex parte* the Metropolitan Board," following the words, "of the Lands Clauses Act."

Mr. *O'Hara* objected to the proposed alteration.

The *Chairman* intimated that this was a technical matter which the learned Counsel must settle among themselves.

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Clause 15 was read.

Mr. *Shrubsole* stated that the promoters proposed to add the following amendment at page 9, line 1, "All monies payable to such company by way of purchase money or by way of rent or otherwise in respect of any such lands, works, or other property, rights, easements, powers, or privileges, shall be paid to the directors or persons to whom the consideration for the purchase of the undertaking of the company was paid or the survivor or survivors of them, or into the Bank of England. If such consideration was paid into the said bank, and such monies in the hands of such directors or persons, or in such bank, shall be subject to all the provisions of this Act applicable to such consideration and the payment and application and distribution of the same.

Mr. *Jones* stated that the Committee having decided the principle in accepting the promoters' substitution for clause 8, he had no objection to make to this proposed amendment.

On the application of Mr. Maclean, "two months" was inserted in the clause instead of "one."

Clause 18 was read.

Mr. *Shrubsole* stated that the promoters proposed to modify the clause by saying that instead of the Metropolitan Board having leave to contribute, there shall be an express obligation on the part of the Metropolitan Board to pay the expenses which may be incurred.

The *Chairman* having indicated that in the view of the Committee the proposed alteration should be made, the clause was postponed.

Clause 19 was read.

Mr. *Jones* asked that, after the words "and whose affairs have been," there should be inserted the words "adjusted or."

Mr. *Bazalgette* stated that the promoters had no objection to the insertion of these words.

The Clause as amended was agreed to.

Clause 26 was read.

Mr. *Davies* proposed to insert after the word "thereto" the words, "and also the costs charged and expenses incurred by the company in reference thereto," and was heard in support of the proposed addition.

Mr. *Phillips* and Mr. *Gates* were also heard in support of the addition proposed by Mr. Davies.

Mr. *Maclean* proposed a similar addition to provide for the costs of the Deptford Creek Bridge Company.

Mr. *O'Hara* was heard against the proposed addition to the clause.

The Committee-room was cleared.

After some time the counsel and parties were called in, and informed that the Committee would retain the clause as printed in the Bill without any addition.

Clause 10, with an addition proposed by the promoters, was read and agreed to.

Upon Clause 12—

Mr. *O'Hara* stated that he proposed to put at the end of the clause, "that is to say, first division, Waterloo Bridge, and the foot-bridges at Cannon-street and Charing-cross; second division, Lambeth Bridge, Vauxhall Bridge, Chelsea Bridge, Albert Bridge, and Battersea Bridge; third division, Wandsworth Bridge, Fulham, otherwise Putney Bridge, and Hammersmith Bridge."

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The Clause, as amended, was read and agreed to.

Upon Clause 17,

Mr. *Maclean* asked that the clause might be amended by inserting words stating that the compensation to be paid to the Deptford Creek Bridge Company should be estimated upon the 2,325 *l.* which they were entitled to receive in perpetuity from the London and Greenwich Railway Company; he proposed the following addition to the clause: "In estimating the consideration to be paid to the undertaking of the Deptford Creek Bridge Company, such consideration shall be estimated upon the basis that the Deptford Creek Bridge Company is entitled to receive not only the actual tolls of such bridge, but also annually and in perpetuity from the London and Greenwich Railway Company, the difference between such tolls and the sum of 2,325*l.*; and when the net value of the tolls actually taken in respect of such bridge by such company shall be ascertained in manner by this Act prescribed, due regard shall be had to the possible determination of the railway company, their lessees or assigns under Section 9 of the Act of 1837, to pay such difference as aforesaid."

Mr. *O'Hara* was heard against the alteration of the clause.

Mr. *Maclean* was heard in reply.

The *Chairman* inquired whether the following words would not meet the case:—"In estimating the consideration to be paid for the undertaking of the Deptford Creek Bridge Company, the net annual value of the tolls and revenue of the said company shall be ascertained separately, in manner by this Act prescribed, and due regard shall be had to the liability of the London and Greenwich Railway, their lessees and assigns, under Section 9 of the Act of 1837, to the payments therein prescribed in respect of such tolls and revenue, and to the possible determination thereof."

Mr. *Maclean* stated that he would assent to the proposal of the Chairman.

Mr. *O'Hara* stated that the Metropolitan Board of Works had no objection to the amendment.

The Clause, as amended, was read and agreed to.

Upon Clause 18—

Mr. *Maclean* proposed after the words, "through the same," in line 39, that the clause should run thus:—"From and after the transfer of the undertaking of the Deptford Creek Bridge Company, all the powers, duties, and obligations of the said company under their special Act with respect to the opening or removing of the drawbridge or swing bridge in the Deptford Creek Bridge for the passage of ships and other vessels through the same, or otherwise, in respect of lighting, repairing, and maintaining the said bridge," &c.

Mr. *O'Hara* was heard against the alteration of the clause.

The *Chairman* stated that the Committee did not think the amendment necessary.

The Clause, as amended, was read and agreed to.

The new Clauses were considered.

Clause 15*a* was proposed as follows: "When the Board has acquired absolute control of the undertaking of any company, the Board shall continue to pay any allowance granted by such company before 1st January 1877, by way of pension to any officer or servant of such company, in like manner in every respect as the same was theretofore paid by such company, and the Board shall grant, by way of compensation for the abolition of office, an allowance to the secretary, clerk or clerks, and toll-collectors of such company, subject to the following conditions: (1.) That such secretary, clerk, or toll-collector shall be in the actual employment of the company immediately before the Board obtained absolute control of such

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12 April 1877.

undertaking, and shall have been in such employment for a continuous period of not less than two years previous to the 1st day of January 1877. (2.) That the amount of such allowance shall be such as would be payable, on retirement, to such secretary, clerk, or toll-collector under Section 2 of the Superannuation Act, 1859, in the event of his having served in an established capacity in the permanent Civil Service of the State for the same time as in the service of the company, and if 10 years were added to the number of years he may have actually served. (3.) That in estimating such allowance the amount of the salary and emoluments upon which the same shall be calculated shall be taken on the average of his salary and emoluments actually received during the three years next preceding such 1st day of January 1877, by such secretary, clerk, or toll-collector as and for his own use, after deducting therefrom any payments or allowances usually made by him. (4.) That no such allowance shall exceed two-thirds of the salary and emoluments upon which the same shall be estimated. Every such allowance shall be payable by two equal half-yearly payments, the first of such payments to be made at the expiration of six months from the date when the Board shall have acquired absolute control over such undertaking: Provided always that the Board may at any time agree with any person entitled to any allowance under this enactment for the commutation of such allowance.

Mr. *Maclean* proposed that the words "or servants" should be inserted in the clause.

Mr. *Phillips* proposed an alteration in the clause to the effect that the allowance made to the clerk of the Vauxhall Bridge should be based upon the salary received on the 1st of January 1877. He also submitted that some special allowance should be made to the secretary of the company, to meet the peculiar circumstances of the case.

Mr. *Bryan Davies*, on the part of the Albert Bridge Company, proposed the following addition to the clause: "Every officer and servant of the company, the undertaking of which may be purchased by the Board under the powers of this Act, shall receive during his life from the Board, by way of compensation for the loss of office, from the time of purchase, an annuity, payable half yearly equal, if he shall have been in the service of the company 20 years, to two-thirds of the annual emolument derived by him from his office or place at the passing of this Act; and if he shall have been in such service less than 20 years, the said annuity shall be diminished at the rate of one-twentieth for every year less than 20 years during which he has been in such service."

Sir *Edmund Beckett* was heard against Clause 15*a*.

Mr. *O'Hara* was heard in support of Clause 15*a*, and against the alterations proposed.

The Committee-room was cleared.

After some time the Counsel and parties were again called in.

Chairman.] The Committee have amended this clause, and have inserted the word "messenger" before the words "toll-collector." In the third sub-section, instead of leaving "emoluments actually received during the three years next preceding such first day of January," they have put "two years," and the Committee have added the proviso, not precisely as proposed by Sir Edmund Beckett, but in these words, "Having regard to the terms of employment of the principal clerk, and the assistant clerk of the Waterloo Bridge Company, under the 49th of George the Third, chapter 191, section 26, when the bridge is purchased, the said principal clerk and assistant clerk shall receive during their respective lives from the Board, by way of compensation for the loss of their offices, from the time at which the Board becomes possessed of the company's bridge, annuities payable half-yearly, equal to three-fourths of the annual emoluments derived by them from their respective offices, on the 16th of April 1877." With that addition, Clause 15*a* has been added to the Bill.

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REPORT

FROM THE

SELECT COMMITTEE

ON

METROPOLIS TOLL BRIDGES BILL;

TOGETHER WITH THE

PROCEEDINGS OF THE COMMITTEE

AND

MINUTES OF EVIDENCE.

Ordered, by The House of Commons, *to be Printed,*
12 *April* 1877.

156.

Under 4 *oz.*

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REPORT

FROM THE

SELECT COMMITTEE

ON

METROPOLITAN FIRE BRIGADE;

TOGETHER WITH THE

PROCEEDINGS OF THE COMMITTEE,

MINUTES OF EVIDENCE,

AND APPENDIX.

Ordered, by The House of Commons, *to be Printed,*
17 *July* 1877.

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Thursday, 8th March 1877.

Ordered, THAT a Select Committee be appointed to inquire into the constitution, efficiency, emoluments, and finances of the Metropolitan Fire Brigade, and into the most efficient means of providing further security from loss of life and property by fire in the Metropolis.

Ordered, THAT the Committee do consist of Twenty-one Members.

Committee nominated of—

Sir Henry Selwin Ibbetson.
Mr. Stevenson.
Mr. M'Lagan.
Mr. Clifton.
Mr. Kinnaird.
Sir Henry Peek.
Sir Andrew Lusk.
Lord Lindsay.
Mr. Herbert.
Marquis of Tavistock.
Mr. Onslow.
Mr. Hayter.
Mr. Forsyth.
Mr. Hankey.
Sir William Fraser.
Mr. Young.
Mr. Locke.
Mr. John Stewart Hardy.
Sir James M'Garel-Hogg.
Mr. Ritchie.
Mr. Hardcastle.

Ordered, THAT the Committee have power to send for Persons, Papers, and Records.

Ordered, THAT Five be the quorum of the Committee.

Ordered, THAT the Evidence taken before the Committee on the Metropolitan Fire Brigade, in Session 1876, be referred to the Committee.

Ordered, THAT it be an Instruction to the Select Committee on the Metropolitan Fire Brigade that they have power to take Evidence and report with special reference to better means of preventing loss of life and property from fire in theatres and other places of public amusement.

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REPORT.

THE SELECT COMMITTEE appointed to inquire into the Constitution, Efficiency, Emoluments, and Finances of the METROPOLITAN FIRE BRIGADE, and into the most efficient mode of providing for the Security from Loss of LIFE and PROPERTY by FIRE in the METROPOLIS, and instructed to take Evidence and Report with special reference to better means of Preventing Loss of LIFE and PROPERTY from FIRE in THEATRES, and other PLACES of PUBLIC AMUSEMENT;——HAVE considered the matters to them referred, and have agreed to the following REPORT:—

I.—PRELIMINARY.

1. YOUR Committee have taken a large quantity of evidence during the present as well as in the preceding Session. They have examined as witnesses: Captain Shaw, the Chief Officer of the Metropolitan Fire Brigade, and a representative from each class of engineers and each class of firemen; the Chief Assistant Clerk, the Accountant, and the Engineer of the Metropolitan Board, and Mr. Bramwell; the Vice-Chairman of the Works and General Purposes Committee, the Chairman and a former Chairman of the Fire Brigade Committee; engineers and other representatives of the various metropolitan water companies; officers of the London Salvage Corps and of several insurance companies; the Commissioner and Assistant Commissioner of Police of the Metropolis and the Commissioner of Police for the City; Mr. Chadwick, deputed by a Committee of the Society of Arts; also various witnesses capable of giving information as to the systems of protection against fire which are in operation at Brighton, Liverpool, and Manchester, and as to the erection of hydrants in the City of London and the Temple.

2. Your Committee have referred to the public documents bearing on the subject of the present inquiry, more especially to—

The Report in 1850 of the General Board of Health on Metropolitan Water Supply.

The Report in 1862 of a Select Committee of the House of Commons on Fires in the Metropolis.

The Report in 1867 of a Select Committee of the House of Commons on the East London Water Bills and the operation of the Metropolis Water Act, 1852.

The Report in 1869 of the Royal Commission on Metropolitan Water Supply.

The Report in 1871 of a Select Committee of the House of Commons on the Metropolis Water Bill, 1871, No. 2.

The Proceedings in 1873 of the Board of Trade Commissioners as to Regulations for Constant Supply in the Metropolis; and

The Report of a Committee of the Society of Arts, communicated to the President of the Local Government Board, and laid before Parliament.

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II.—ADMINISTRATION OF FIRE BRIGADE.

As to the Administration of the Fire Brigade Act by the Metropolitan Board of Works.

28 & 29 Vict. c. 90. 3. The present brigade was established by an Act passed in 1865, which came into operation on the 1st of January in the following year.

4. Previous to 1865 the provision for the extinction of fire in the Metropolis consisted of a force called the London Fire Engine Establishment, voluntarily set on foot and supported by the insurance companies at a cost of about 25,000 *l.* per annum, and of engines, &c., maintained by the several parochial authorities, in pursuance of 14 Geo. 3, c. 78, and the Lighting and Watching Act (3 & 4 Will. 4, c. 90, s. 44). There were also a certain number of fire escapes voluntarily established by the Royal Society for the Protection of Life from Fire. The Fire Engine Establishment, however, provided only for the central parts of the Metropolis where the insured property was mainly situated, and even for that area was insufficient, and moreover, its continuance was pre-
6500. carious, some of the insurance companies declining altogether to contribute, and the others being in consequence unwilling to bear the entire cost of the brigade.

5. In 1862, a Select Committee of the House of Commons had been appointed to consider the matter, and they reported in favour of a brigade to be established under the Commissioner of Police. The Government of that day, however, thought it more advisable that the authority should be the Metropolitan Board of Works, one reason being that the area which the brigade was to serve was to be the Metropolis subject to the jurisdiction of the Board.

6. It appears that Sir G. Grey, then Home Secretary, who was in charge of the proposed measure, consulted Captain Shaw, who commanded the Fire Engine Establishment, and requested him to submit a scheme and estimate for the new
1212. brigade, taking into account the then condition of the Metropolis, its population and area, and the number of houses and value of property to be protected. Captain Shaw's first scheme showed a probable annual cost of 70,000 *l.*, but was set aside as too expensive. The second scheme, with an estimate of 52,000 *l.*, was rejected for the same reason. Captain Shaw was then instructed to frame a third scheme limited to a cost of 50,000 *l.* as the sum which it was contemplated would be yielded by a ½ *d.* rate on the Metropolis, if reinforced with contributions from Government and insurance companies, Sir G. Grey being of opinion that Parliament would not sanction the imposition of any higher rate on the metropolis for the purpose of protection from fire. With regard to capital, an outlay was contemplated of 40,000 *l.* in addition to the plant and stations of the Fire Engine Establishment, which were to be transferred to the Board without payment. It was on this basis that Captain Shaw submitted his third scheme, and that Sir G. Grey introduced and carried the Bill. No provision was made in this scheme for working the fire escapes, which were not at that time proposed to be taken over by the Metropolitan Board.

7. The Act declared that after 1st January 1866 the duty of extinguishing fires and protecting life and property in the case of fire should, within the Metropolis, be entrusted to the Metropolitan Board of Works.

8. The area to be served by the Brigade was defined as the Metropolis, *i.e.*, the City, and parishes and places outside the City which are under the jurisdiction of the Metropolitan Board. This area is smaller than the area served by the Metropolitan Police and the City Police; smaller also than the area served by the various Metropolitan Water Companies. The Act, however, enabled the fire brigade to render, for payment, special services beyond the Metropolis.

9. The Act regulated the relation of the Board and the Brigade to the police, and to the water companies, both of whom, it is obvious, exercise important functions with regard to extinction of fires. These matters will be dealt with separately

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separately in a subsequent part of this Report; for the present your Committee would confine themselves to the consideration of the manner in which the Fire Brigade has been established and administered by the Board.

10. The Board was empowered to purchase, if it thought fit, the stations and plant belonging to the parochial authorities, but the stations and plant of the Fire Engine Establishment were to be transferred without any payment except the satisfaction of all existing obligations of the insurance companies with respect to the establishment, including the pensions of any officers already retired. The mortgages on the stations, it is necessary to mention, amounted to 7,000 *l.* 2979.

11. In order to meet the capital expenditure requisite to start the Brigade, the Board were authorised to raise a sum of 40,000 *l.*, and in the course of the 10 years subsequent to the passing of the Act, they, on two occasions, received further borrowing powers, the aggregate amount of capital actually borrowed (up to the time when the sittings of your Committee commenced) being 130,000 *l.*, viz.: —

	£.
Under Fire Brigade Act, 1865 - - -	40,000
Under Metropolitan Board of Works Loans Act, 1869 - - - - - - - - -	75,000
Under Metropolitan Board of Works Loans Act, 1875 - - - - - - - - -	15,000
TOTAL - - - £.	130,000

The whole of this sum has been expended solely in the providing of station-houses, fire-engines, fire-escapes, and permanent plant; no part could have been lawfully applied, or in fact has been applied, to meet current expenses properly chargeable to income.

12. Before, however, this summary of expenditure can be accepted as representing the powers which the Board, from time to time, during the 10 years, possessed of raising capital for the purpose of the Fire Brigade, some further explanation is necessary as to the 75,000 *l.* raised under the Loans Act of 1869.

13. By that Act (which instituted the Consolidated Rate, and which was brought in as a Bill by the Government), the Board were enabled to borrow a sum not exceeding 10,000,000 *l.* to cover the aggregate of their then actual and prospective liabilities in respect of main drainage, embankments, and other purposes therein specified, amongst which were those of the Fire Brigade Act.

14. The Loans Act, however, did not specify the respective amounts of the several liabilities, and therefore did not apportion the moneys so authorised to be raised, but the limit of 10 millions, it appears, was inserted after a careful estimate made by the Board, and approved by the Treasury, and in this estimate (the substance of which was read to the House of Commons by the Secretary to the Treasury) the sum set down as that which would probably be required for the purposes of the Fire Brigade was 50,000 *l.* The estimate, however, also left a margin of 136,000 *l.* for contingencies on all the undertakings mentioned in the Act, and for minor improvements; and, in the result, the Metropolitan Board, with the consent of the Treasury, drew upon this margin for the purposes of Fire Brigade a sum of 25,000 *l.*, in addition to the sum of 50,000 *l.*, making together a total of 75,000 *l.*

15. In raising this sum of 75,000 *l.*, your Committee are of opinion that, regard being had to the demands of their other undertakings, the Board exercised to the full the powers which under the Loans Acts of 1869 were practically available to them for the purpose of borrowing for the Fire Brigade. It is true that the limit of 10 millions was not at the commencement of this inquiry actually reached, and that the provisions in the Act of 1869, the general terms

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of which were not incompatible with the appropriation of any part of the balance to the Fire Brigade, have not been formally repealed. Practically, however, the balance is entirely pledged for other purposes, and had it been otherwise, any power to divert it to the Fire Brigade has now been taken away by the indirect operation of the Act of 1875, which enacted that in future annual budgets should be laid by the Board before Parliament, and in pursuance of this rule, provided for the year ending 31st December 1876, for increasing the capital outlay on the Fire Brigade by a sum not exceeding 15,000 *l.*, redeemable in 30 years; and it is beyond question that since the passing of the Act of 1875, no further money could be borrowed for the Fire Brigade without the consent of Parliament.

38 & 39 Vict. c. 75.

16. Your Committee think it right to mention that, since their appointment, the Board has obtained further powers of borrowing. By the Metropolitan Board of Works (Loans) Act, 1876, it is declared that Section 3 of the Loans Act of 1875 shall be construed as if the amount authorised to be raised up to 31st December 1876, had been limited to 55,000 *l.* instead of 15,000 *l.*, and the Board are further authorised to raise up to 31st December 1877 a sum not exceeding 20,000 *l.* The combined effect of these two enactments will therefore be to add 60,000 *l.* to the capital outlay upon the brigade, making a total of 190,000 *l.*

39 & 40 Vict. c. 55.

17. With respect to income, the sources prescribed by the Act of 1865 have remained unchanged, except that by the Act of 1869 the interest accruing since that date on the borrowed capital is made chargeable on the Consolidated Rate, instead of being defrayed out of the income of the Fire Brigade. That income, however, has been rapidly progressive from the nature of its sources, as is shown by the following Table:

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ANNUAL YIELD.

SOURCES OF INCOME.	1866.	1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876. (By estimation.)
	£.	£.	£.	£.	£.	£.	£.	£.	£.	£.	£.
1. A sum from the rates equivalent to ¼ *d.* in the £. in the Metropolis (now levied by the Consolidated Rate) [3422].	30,913	31,795	33,742	33,869	38,998	38,923	41,606	42,266	42,810	43,514	48,148
2. A contribution from the insurance companies insuring property in the Metropolis, the contribution being at the rate of 35*l.* in every million on the gross amount insured in the Metropolis [3425].	11,050	11,285	13,794	14,391	14,896	15,442	16,126	16,475	17,097	18,093	18,905
3. A grant voted annually by Parliament of 10,000 *l.*	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000

In addition, there have been in each year miscellaneous receipts from penalties imposed on occupiers of houses where chimneys have been on fire, from payments for special services rendered beyond the metropolitan limits, and from other minor sources.

18. The whole of the income thus obtained has been spent upon the brigade. In the earlier years, up to the Loans Act of 1869 (which conferred on the Board further powers of borrowing), a considerable part was applied to what would be more properly capital expenditure, and in 1867 the Board enlarged its operations by taking over from the Royal Society of Protection of Life from Fire the charge of fire escapes, which, as conducted by that society, required an annual outlay of 8,000 *l.* or 9,000 *l.*, and has since increased to from 13,000 *l.* to 15,000 *l.* per annum. Nor did the Board obtain for the purpose any additional resources, notwithstanding that the Main Drainage Committee, to whom the question had been referred, had, in the previous year,

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year, reported to the Board that the whole, or nearly the whole, of the income was required for the protection of property, and that if the protection of life was also to be undertaken it would be necessary that the Board should apply to Parliament for further taxing powers.

19. From this, amongst other causes, in several instances the accounts of the year showed a deficit which had to be made good out of the income of the succeeding year, and throughout the whole of the period of 10 years the Board have felt themselves more or less hampered for want of means.

20. But with the one exception above mentioned (as to the relief from the interest on borrowed capital) the Board have made no application to Parliament for authority to enlarge the income of the brigade, being restrained partly by the strong opinion expressed by Sir G. Grey at the commencement as to the necessity of restricting the rate to ½ *d.*, and partly no doubt by a sense of the great demands which they were making on the ratepayers for other and larger undertakings.

21. With respect to the mode in which these funds have been spent, no complaint was made to your Committee of any wasteful outlay on the part of the Board; no want of economy can be inferred from contrasting the establishment actually maintained by the expenditure of the present time with the establishment which the estimate of 1865 was expected to provide, a universal rise in prices having taken place since that date; and apart from the fundamental question as to hydrants, that is to say, assuming that the system of extinguishing fires by means of engines fed by water procured from the pipes through plugs was the proper system to be developed, there is no reason to doubt that the expenditure of the Board has been judicious.

22. The Board administers the Act chiefly through a special committee called the Fire Brigade Committee, to whom, in exercise of the authority conferred by the Act, it has delegated certain of its powers; but the Board reserves to itself the final settlement of the larger questions, such as the amount of salaries, the purchase of fire engines, and the erection of additional stations, &c., and from time to time refers other matters (*e.g.*, the questions of superannuation and hydrants) to the Works and General Purposes Committee. 28 & 29 Vict. c. 90, s. 28. 4746.

23. To Captain Shaw is entrusted the disposal and control of the force, and in these matters his discretion is unfettered; he is also present at the deliberations of the Fire Brigade Committee, but he has no voice in their decision. 857. 859. 1717. 3861.

24. The brigade is recruited exclusively from sailors of the Royal Navy and Merchant Service. 1136, Shaw.

25. With regard to the efficiency of the force, your Committee are glad to be able to report that there is a general agreement as to the promptitude, energy, and courage of the men, and as to the skill with which they are handled by their officers.

26. Statistics were put in by the Board, showing that in the course of the 10 years the proportion of what in the books of the brigade are termed "serious fires," as distinguished from "slight fires," has been reduced, having fallen from 24 per cent. of the whole in 1865 to 11 per cent. in 1875, and having in 1872 been as low as 8 per cent. It is, however, difficult to attach an exact value to these statistics, both because the expression "serious fires" is one which it is acknowledged does not admit of a precise definition, and because the number and, to a certain extent, the degree of fires depend on circumstances over which the brigade has no control. 136. 129. 1170, 71.

27. The following Table exhibits the actual constitution of the brigade in the year 1875, as compared (1) with the force, which it superseded in 1866, (2) with the establishment which Captain Shaw estimated as necessary in 1866, in his third and lowest estimate of the preceding year; and (3) with the establishment which, in the opinion of the same officer, would

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be needed at the present time, in order completely to meet the requirements of the Metropolis :—

		Area in Square Miles for which Force operated.	Cost.	Stations.			Fire Engines.			Fire Escapes.	Men.		
				Land.	Floating.	Total.	Land.	River.	Total.		Fire Brigade.	Fire Escapes.	Total.
1866	Force taken over from the Insurance Companies.	10	- -	17	2	19	-	-	38	- -	214 (including 85 parish engine keepers.)	-	-
1866	Force as proposed by Captain Shaw in his Third Estimate.	121	50,000	-	-	89 (but of these, 37 were minor stations.)	-	-	129	Not included in Estimate.	351	-	-
1875	Actual Force - - -	121	- -	49	4	53	111	3	114	106	268	130	398
1876	Force which, in Captain Shaw's opinion, would be complete.	121	120,000	-	-	169	-	-	330	200	-	-	931

28. Your Committee will now proceed to consider the criticisms which have been based on these figures, and the shortcomings that have by various witnesses been imputed to the existing establishment and administration; but at the outset your Committee would wish to guard against a misconception that might arise from the separate treatment of this part of the subject.

29. The present establishment of the brigade is constituted on the assumption that the entire work of fire extinction, properly so called, belongs to the brigade, unassisted in this respect by the police, and that the only mode of extinguishing fires is the use of fire engines fed by the release of water through plug holes on the water pipes. If this system is to be maintained, a considerable increase to the establishment of the brigade will, as presently pointed out, be undoubtedly required; but much of this increase would cease to be necessary, and ultimately, even large economies might become possible, if the police force and police stations could be utilised, and if the method of fire extinction by means of hydrants could be adopted, two important questions that are reserved for subsequent consideration in this Report. The subject in fact cannot be dealt with satisfactorily, except as a whole.

30. To take, then the various points of complaint, in succession :—

575. 3186. 3197. 3202. 4832 B.

31. The head-quarter station in Watling-street has long needed to be replaced by another more easy of access, and offering much larger space accommodation. A recommendation to this effect was offered by Captain Shaw in October 1868, and was repeated by him in 1872 and 1875, but the acquisition of such a site was attended with difficulty from financial and other causes. Since the commencement of this inquiry a site has, however, been obtained in Southwark Bridge-road.

1318. 608–615, Shaw. 6320. 6393, Lovell. 7096 *et seq.*, Swanton. 3502–13, De la Hooke.

32. It was shown to your Committee that in three out of the four districts in which the Metropolis is divided for the purposes of the fire brigade, there are places more than a mile distant from the nearest station. This provision seems to your Committee to be decidedly inadequate, if reliance for the extinction of fire is to be placed exclusively upon the engines of the brigade. Captain Shaw, indeed, went so far as to say that the establishment would not be complete unless the existing number of stations was more than trebled. Complaints were also made before your Committee that in several cases stations which were conveniently near for the protection of warehouses, &c., containing large accumulations of insured goods, had been abandoned for stations further off selected for more general but less important considerations. Your Committee are of opinion that these complaints were substantiated in the case of the Farringdon-street and Sloane-square stations.

33. Near

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33. Near the river, where in some places there are vast warehouses with an indifferent water supply on the land side, the main provision for extinguishing fires consists of floating engines, and this provision, though much enlarged since the establishment of the force, is, in the present condition of the water supply, still far from sufficient. A plan suggested by the insurance companies in 1871 (of small floating engines having the propelling and pumping machinery on one bottom) was rejected by the Board on the advice of Captain Shaw; in July 1874 Captain Shaw made a new suggestion of steam launches to bring up the rafts quickly to the scene of fire, but no definitive action has been taken upon it, chiefly, it would appear, from want of funds. 6445. 2923. 2912. 3435. 2923. 2915. 3436. 2919. 6342.

34. *Sleeping Quarters.*—Before taking over the brigade the Board, on the 24th of November 1865, came to a resolution that for the present, and until further order, the whole of the men to be employed in the Metropolitan Fire Brigade should live at the stations to which they were attached. The stations existing at that time were not such as to admit of this resolution being carried out, and could not in many cases be enlarged. But notwithstanding the above resolution, the new stations built by the Board during the first few years of their administration were not constructed with sufficient sleeping room, the reason being the want of funds. But in the year 1869 the Board, as already stated, acquired further borrowing powers, and the stations erected since that date are all provided with sleeping quarters sufficient for the men who are posted there, and also in the case of firemen belonging to the 1st and 2nd class for their wives and families. The absence of the same accommodation at the older stations obliging the men to be lodged out in the neighbourhood is detrimental to the service. There are altogether 26 stations where it is necessary in consequence to allow extra time for the running out of the engines. 552. 2979. 2980, but *see* 557. 2974. 3515–3520. 4023. 565.

35. There is no telegraphic communication between the fire-brigade stations and the police stations with two exceptions, Watling-street being connected with Scotland-yard, and the fire-brigade station at Woolwich being connected with the police station at Shooter's-hill. 529, 530.

36. Telegraphic communication is also absent between the fire-escape stations and fire-brigade stations; fire-escapes are not manned in the daytime, and the number of them (106) your Committee consider to be below the requirements, Captain Shaw recommending that it should be raised to 200. 3840. 6789. 1041.

37. The strength of the force is, in the judgment of your Committee, inadequate for the work which is now assigned to them. If from the total force as now established of 398 men, there be deducted 130 as approximately representing the number employed in fire-escapes, it will be found that the number of men serving the stations and engines in 1875 is less by 83 than the number which Captain Shaw provided for in his lowest estimate of 1866, an estimate stated by him to have been prepared at the time, not as, in his opinion, an efficient force, but solely as the best force possible with the restriction of 50,000 *l.* to which he was limited, although in the interval the population of the Metropolis has increased 17 per cent., and the accumulation of property to an unknown but certainly enormous degree. 629.

38. One consequence of the limited number of the brigade is that neither the engines nor fire-escapes can always be worked with that thorough effectiveness that ought to be invariably assured. The proportion of men has to be supplemented as best it may, partly by the improvised assistance of by-standers, to whom a slight remuneration is made for their services, and partly by extraordinary energy on the part of the firemen engaged, the officers being frequently diverted from what would be their exclusive duty, the superintendence of operations, in order to lend a hand in the performance of rank and file duties. 681.

39. Another consequence is, that when a call is made on a station on account of fire, the station is left weak-handed for any further demand, perhaps with only one man to keep up the communication, perhaps with none, and then the station is temporarily closed. A district thus cut off from all means of communication is in a helpless condition in the case of a fire occurring within that district while the station is closed. It is, however, to be remembered that all that is necessary is that each station should be sufficient to deal with the normal requirements of its district; in case of emergency, reliance may fairly be

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placed upon assistance to be obtained from neighbouring districts, the brigade being so organised as to admit of easy or rapid concentration.

5321. 3916. 4053. 40. A third consequence of the paucity of numbers is to aggravate the lot of those that are employed. It occasionally happens that men are engaged in active and exhausting labour for many hours at a stretch, and in some cases 2947. 3908. this overwork and want of rest coupled with exposure, have led to sickness and premature breaking down. But it was completely substantiated that, for want of men, it is not possible to allow the proper amount of relaxation. The men have few nights in bed, and except on special leave, which can be but 304. 307. 686. sparingly granted, they cannot quit the station at any time during the 24 h urs, as they must be on the spot to obey a summons which may come any instant. Loss of liberty and long periods of constrained inaction are no doubt inseparable from a fireman's calling, but they constitute its most trying incidents; and the service can hardly be said to be properly organised unless it provides reasonable relaxation. For the want of this the fireman's life is made needlessly irksome, and the popularity of the service seriously impaired. Captain Shaw represented 1005. that in order to redress this grievance, it would be necessary to enlarge the brigade by 50 per cent. or 200 men, without any increase of duties; it may perhaps be said that this estimate errs on the side of liberality; but at all events this inquiry by your Committee has already convinced the Board of the expediency of taking some steps in the matter, and Captain Shaw has now been 4997 B. authorised to employ assistants in the place of all men sick and all men under instruction, a change which has already produced a considerable mitigation.

41. But the most serious result arising from the short-handedness of the force is, that there is left no reserve at all adequate to deal with any extraordinary emergency such as might happen any day or night, if two or more exceptionally large conflagrations were to take place at the same time. Hitherto the force has proved equal to any strain that has been put upon it, but the total force available at night (after deducting the number of men on escape duty, or station duty, or sick, or under instruction) appears to be under 200 men, 7581. nearly all of whom have, in some cases of large fires, been employed at one fire, thus leaving the whole of the other parts of the metropolis dependent on the few men left on station duty. To meet such contingencies, Captain Shaw recommended that the force should be increased to 930 men, with a corresponding increase of stations and plant, as already mentioned. Your Committee reserve to a later part of their Report their opinion as to the mode in which this important matter should be dealt with. For the present, they would only point out that Captain Shaw's estimate of the necessary addition was framed on the supposition that the brigade should be self-sufficing.

42. *Superannuation.*—A serious grievance put forward by the men was the absence of any provision for superannuation. In the fire-engine establishment, administered by the insurance companies, there seems to have been no regular system of superannuation, but the companies are stated to have been 3005. liberal in their dealings in cases where a pension appeared to be deserved. There was, however, a fund called a "Superannuation Fund," to which each man subscribed 6 *d.* a-week out of his pay, and from which, on retirement, he was allowed (unless he was awarded a pension) to withdraw the whole amount he had paid in, with accumulations; and in case of his death this right passed to his executors. On the Metropolitan Board taking over the stations and plant of the companies' establishment, the men agreed to transfer their services on receiving an assurance from the Board that the arrangement as to the fund should be continued, and that in every case a pension should be awarded to the widow of a man killed in the service. No scale of pension, however, was fixed for these cases, nor did the Board exercise the powers which they had under the Act to make regulations with respect to the compensation to be paid to the firemen in case of accident, or to their wives and families in case of their death whilst in the service, or with respect to the pensions or allowances to be paid in case of retirement.

4505. 43. Accordingly the former arrangement as to the superannuation fund
3576. was merely continued, except that in the year 1870 the title was changed to "savings fund," the subscriptions being regularly invested in metropolitan stock, and the interest accumulated. As a fact, only three firemen have

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have been killed in the service. In two of these cases the men were unmarried, and nothing was given, though in one of them the father of the deceased made an application representing that he had been partly dependent on his son's earnings. In the third an allowance was awarded for a year to the widow, but was then stopped, because the public had raised a subscription of 1,775 *l.* for the family. In the case of firemen dying in the service, gratuities varying between 10 *l.* and 40 *l.* have been given, but only where a widow or children had to be provided for. And, in addition, 5 *l.* is allowed for funeral expenses, whether the fireman died or was killed in the service, which, on a representation by Captain Shaw that this sum was quite insufficient, the Fire Brigade Committee recommended should be increased to 7 *l.* 10 *s.*, a recommendation which was not, however, adopted by the Board.

See pp. 629, 630 of Appendix.
3693.

44. In case of retirement for infirmity, pensions have been granted in all the instances where service has exceeded 11 years, but these are only four in number. In 33 other instances small gratuities have been given by way of addition to the savings returned from the fund.

45. The men appear to have been much dissatisfied, and not without reason, both at the slender amount of the pensions and gratuities when granted, and at the refusal of pensions in other cases, but so far as appears, the first remonstrance on the subject was addressed to the Board in 1873. Early in the following year, a formal scheme was submitted by the men for acceptance by the Board, and from that time onwards the matter in different forms engaged the attention of the Fire Brigade Committee, the Works and General Purposes Committee, and the Board itself. These deliberations, however, came to no definitive result until after this Committee had been appointed. On the 31st March 1876, a scheme was approved by the Board; but the very next day, before it was formally issued, the men presented a memorial in which they unanimously rejected it. The matter was then allowed to drop for a time, but early in the present year another superannuation scheme, a copy of which will be found in the Appendix to this Report, was proposed by the Board and accepted by the men, and is now in operation.

4825.

46. In the judgment of your Committee, it is a matter for regret that this redress came so late. In justice to the Board, however, it must be borne in mind that the Board were not under any absolute contract to provide superannuation (except to the widows of those killed in the service); that the framing of a superannuation scheme, to be satisfactory both to the Board and to the various ranks of those employed, was a work which would under any circumstances have required much care and consideration; but in this case was peculiarly complicated on account of the necessity to make special provision for back service, the fire brigade having existed so long without a system of superannuation, and having been originally constituted of men transferred from two other services, neither of which was under the Metropolitan Board. The Committee would further express their opinion that the men, being misled by the not-sufficiently explicit language of the scheme of 1876, rejected it, without asking for an explanation of its provisions, which at all events, in their retrospective operation, were liberal.

47. As the result of the dissatisfaction felt by the men on these various grounds, Captain Shaw represented to your Committee that the service had been rendered less popular than it would otherwise have been. In proof, he stated that he experienced difficulty in obtaining recruits, and had found it necessary to lower the standard; that whereas the age of admission was originally not to exceed 25, it had recently been relaxed to 30, and that even this limit could not always be adhered to. Your Committee, however, consider that the difficulty of obtaining firemen is in part to be attributed to the rule of the brigade, that none but sailors should be admitted, a rule which, according to the experience of the brigade at Manchester and Liverpool, and in the opinion of your Committee, it is not necessary to insist upon.

936.
918. 926.
6862.

48. The results of the examination by your Committee into this part of the subject may be thus summed up: If the present system of fire extinction is to be continued, that is to say, if, as heretofore, fire engines are to be the only appliances employed, and if for the purpose of working those engines a separate

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force is to be maintained under the Metropolitan Board, your Committee, without adopting the exact figures named by Captain Shaw, are of opinion that, as pointed out by him, there are required more stations, more engines as well on the river as on land, more fire escapes, better telegraphic communication, and an increase of the force both for ordinary operations and for special emergencies; in short, a general extension of the establishment, involving a large additional expenditure.

III.—POLICE.

49. The Fire Brigade Act expressly authorised all police constables to aid the brigade in the execution of their duties, and gave them power to close streets, and to remove any persons interfering with the operations of the brigade. General orders have accordingly been issued on the subject, by the Commissioner of the Metropolitan Police, copy of which was laid before your Committee. From these, it appears that the first duty of a police constable on the breaking out of a fire on his beat is to give the alarm on the spot, and arouse the inmates and neighbours; next, he gives or sends (generally by means of a bystander), notice, not only to the nearest police station, but also to the nearest fire-escape station, to the nearest fire brigade station, and to the turncocks, and the regulations expressly declare it to be the duty of each constable to be possessed beforehand of all the information that may be necessary for the purpose. If the police arrive before the brigade, it is their duty to exert themselves in every way for the rescue of persons in danger, and the removal of property, comformably with the wishes of the proprietors; also to secure a clear space for the action of the fire brigade. But as soon as the firemen arrive, the police fall back on their normal duty of preserving order, which, when a large crowd has collected, becomes a matter of considerable difficulty. In the case of a serious fire, notice is always sent at once to the assistant commissioner and district superintendent.

50. It is satisfactory to your Committee to be able to report that the relations between the fire brigade and the police are of a cordial and harmonious character, each force, however, confining itself to the independent exercise of its proper functions.

3981.
2940.

Appendix, No. 9, p. 641.

51. In the course of the inquiry it was admitted on all hands that the Metropolitan Police might in several further respects be utilised as auxiliary to the Fire Brigade without involving any change of organisation in either force, any interruption of police duties or other inconvenience, and at a trifling expense. Many witnesses of practical experience, notably Captain Harris, the Assistant Commissioner of Police, went further, and recommended that the fire brigade should be incorporated with the police; but this latter proposition was not approved by others, especially by the Commissioners of Police for the Metropolis and for the City.

52. The case appears to stand thus: At present the duty of extinguishing fires is assigned exclusively to the fire brigade under the Metropolitan Board. Apart from any difficulty arising from water-supply, which will hereafter be considered, and apart also from the fact that a large portion of the metropolis requiring protection lies outside the jurisdiction of the Metropolitan Board of Works, the two main defects inherent in the system appear to be—1. The interval that necessarily elapses before operations for the extinction of fire or preservation of life can begin, owing to the fact that neither the brigade, nor the turncocks, nor the fire escapes are on the spot, and—2. The lack of a reserve force in the brigade to meet any extraordinary conflagration or conflagrations. With respect to the first, it has been shown that the brigade stations are placed at considerable intervals; and it must be remembered that the distance between the site of the fire and the brigade station applied to has to be traversed twice, once by the messenger from the fire to the station, and a second time by the brigade from the station to the fire. The same remark applies with respect to the turncock and the fire escape. It is during this interval, at the commencement of the fire, that assistance is most efficacious. Every moment that passes greatly enhances the difficulty. As regards the question of reserve, your Committee have already adverted to the fact that, as the brigade is at present constituted,

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constituted, the total force available at night-time for active service in the extinction of fires is under 200 men. Now it is clear that neither of these defects admits of being completely remedied by the Metropolitan Board, except at a great expenditure on a corresponding addition to their establishment, both of stations and men, and that this expenditure is so far questionable in that the use of this addition to the establishment will be not constant but only occasional. On the other hand, the Metropolitan Police, a disciplined force of 10,000 men distributed over the metropolis, and constantly patrolling the streets, with stations and standpoints at short distances from each other, and complete telegraphic arrangements seems admirably adapted to supplement in the most economical manner these two defects. Moreover, the police already exercise certain functions in connection with the brigade, and it cannot be doubted that unity of management and responsibility would produce increased efficiency.

53. It will be convenient, however, to exhibit the proposal in further detail. The metropolitan police have 152 stations, of which 75 are within the jurisdiction of the Metropolitan Board, each station being connected by telegraph with the head-quarter station of the division. If this head-quarter station were connected by telegraph with the fire brigade station of the district, the result would be at once to add, within the area at present served by the brigade, 75 to the number of places from which notice of fire could be immediately communicated to the brigade. Again, each police station has more or less space attached to it where apparatus for the extinction of fire, such as manual engines, hose, axes, folding ladders, &c., might without inconvenience be kept, and where men would be available for immediate service, it being the custom for some 30 or 40 constables off duty to be present at each station. The only expense required would be the cost of additional fire appliances and telegraphic communication.

Harris, 7777. Harris, 7854. 7937. 7734. 7878.

54. Further, besides the police stations, there are in the Metropolitan Police District (and mostly within the jurisdiction of the Metropolitan Board) 280 fixed points at which a constable is stationed 16 hours out of the 24. It would only be necessary to appoint an additional constable at each fixed point during the remaining 8 hours, to connect each fixed point by telegraph with the fire brigade station, and to provide in a sort of sentry box at the point a small quantity of fire appliances of the same character as those proposed to be kept at a police station, and there would thus be gained more than 200 places from which the fire brigade could be summoned by telegraph, with an intimation of the exact locality of the fire, and as many places from which personal assistance could be rendered, assistance it may be of a single individual, but one on the spot, trained, equipped, and officially responsible.

Harris, 7814.

55. The result of this utilisation of police stations and fixed points would be, that in the same area as that now served by the brigade,—the metropolis proper,—there would be, instead of the 53 stations now existing, 328 places from which assistance, more or less, could be immediately procured for the extinction of fires, and in addition there would be constituted more than 150 such places in the parts of the metropolitan police district lying outside the metropolis. Looking to the supreme importance of moments at the early stages of a fire, the advantage of such co-operation from the police, even under the present conditions of water supply, can scarcely be overrated.

56. The advantages of the police force as a reserve in case of an extraordinary conflagration, need no special explanation.

57. Colonel Henderson is not in favour of an amalgamation of the fire brigade with the police, being apprehensive lest such additional duties thrown on the police with respect to the extinction of fire might interfere with the discharge of their duties as constables. Colonel Fraser points out, that so far as the City is concerned, the area is so small, and so well provided with fire stations, that the reasons in favour of amalgamation scarcely seem to apply.

58. Captain Harris, on the other hand, takes a different view. He sees no difficulty

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difficulty in the proposed amalgamation, indeed has long been of opinion that without such an amalgamation, the metropolis can never be adequately protected against fire, and he has furnished the Committee with an elaborate plan by which he proposes such an arrangement should be effected. His opinion coincides with that of the late Commissioner of Police, Sir Richard Mayne, and with the recommendation of the Select Committee which originally suggested the establishment of a public fire brigade.

59. The objections taken to the employment of the police for the extinction of fires appear to your Committee not to be borne out either by the circumstances of the case or by experience; for where the system has been already tried, as at Liverpool, Manchester, and the Royal Dockyards, it has proved successful. The only difficulties that attend the proposal seem to arise from the fire brigade being already under the Metropolitan Board, and from the co-existence of two police forces in London, one for the City and another for the rest of the metropolis. Your Committee, however, consider that objections on these grounds ought not to prevail. The advantages of the police force, with its numbers, its stations, and organization, are such as no extension however great of the fire brigade establishment under the Metropolitan Board could properly secure, and they would be attained at much less cost to ratepayers; moreover it would thus be possible to extend the operations of the fire brigade to the whole of the metropolitan police district, the outer parts of which (the suburbs lying beyond the jurisdiction of the Metropolitan Board) are at present very imperfectly protected against danger from fire. Nor do your Committee see any reason why the Corporation should be more unwilling to admit into the City the fire brigade as a distinct branch of the metropolitan police than they have been to admit the present brigade when a separate force subject to the jurisdiction of the Metropolitan Board. The rest of the metropolitan police not belonging to the fire brigade, would not be empowered to act within the City, except as hitherto on the express requisition of the City authorities.

60. Your Committee, therefore, have arrived at the conclusion that if such extension of the fire brigade as they have already pointed out to be necessary is to take place, it would be best accomplished, both in respect of economy and efficiency, by the brigade being constituted a branch of the Metropolitan Police—a distinct branch under the immediate directions of an Assistant Commissioner to be appointed for the purpose. The preliminary action of the constables and the special operations of the firemen would thus be brought into closer concert. The police stations and stand-points would be utilised for the purpose of the brigade, and the whole force of the police would be available as a reserve. These conclusions are irrespective of any change that might be adopted in the system of metropolitan water supply, or in the mode of using water for the extinction of fires—questions which your Committee will now proceed to consider

IV.—WATER SUPPLY.

61. London, and by this term is meant an area considerably larger than the Metropolis technically so called, is supplied with water by eight companies. These companies are commercial associations, from time to time established by private Acts of Parliament, primarily for the purpose of selling water for the daily consumption of the inhabitants within their districts.

62. They are controlled in common by certain general enactments, the Metropolis Water Acts of 1852 and 1871, and provisions in the Fire Brigade Act of 1865, also the Waterworks Clauses Act of 1847, which is expressly applied to them. But, subject to these general enactments, they are governed by their own special Acts, each company having an independent area, a separate system of pipes, and peculiar regulations suitable to its own circumstances. None of the companies are under any obligation to provide water sufficient for the extinction of fires; all that is required of them under the general enactments above-mentioned is to allow the gratuitous use of their water for this purpose, and to grant certain special facilities, which will presently be noticed. But, except in

See p. 664.

See 3833 B.

10 Vict. c. 17, s. 42.

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in these particulars, the companies throughout the Acts, whether public or private, are treated as mere purveyors of water for ordinary consumption, and are authorised in carrying on this business to consider solely the convenience of their customers, and the profit of their shareholders. The result is that whilst what is needed for the extinction of fires is an immediate and ample delivery of water, the three main conditions by which such a delivery is ensured, viz., constant supply, high pressure and large pipes, are regulated with a view, not to the extinction of fires, but to the domestic and manufacturing requirements, which are far more easily satisfied.

63. The convenience of constant supply to ordinary consumers needs no explanation, but its value for the purposes of fire extinction is of yet greater moment. With a constant supply, a fireman, without waiting for a turncock, can obtain water immediately from any pipe, but under an intermittent system it is useless for him to have access to the pipe, unless it happens to be charged at the time; he must needs wait for the turncock to turn the water on to the point of delivery, and in the meantime the fire will advance possibly beyond control. The companies are under no statutory obligation to give a constant supply. They can be required to do so either by the Metropolitan Board, or by the Local Government Board. But no such requisition has been made on account of the cost that would be occasioned by the necessary alteration of the house fittings. As a fact, two only of the companies, the East London Company and the Kent Waterworks Company, have for their own purposes established a constant supply, and that only in parts of their districts; and in addition to this, the mains (all the mains of some companies, and some of the mains of other companies) as distinct from the smaller service pipes which lead off the water from the mains to streets or groups of houses, and from the still smaller communication pipes which distribute the water to the individual customers, are constantly charged night and day. But as will presently appear, under the existing system of fire-plugs, water cannot be drawn direct from the mains. 34 & 35 Vict. c. 113, s. 8, 11.

64. The amount of the pressure on the water in the pipes is a question of primary importance to the consumer as determining the level at which his cisterns, &c. can be supplied. But it also limits the means available for the extinction of fires, since it affects the rapidity, and, therefore, the volume of discharge, and also the height of a jet deliverable from the extremity of the pipes. It will be found, however, that the service level alone is enforced by the law. In order to attain the elevation from which pressure is derived, the whole of the water provided for the Metropolis by each of the companies has to be pumped. In some cases the mains are filled direct from the pumps, in others by the intervention of a reservoir from which the water is allowed to gravitate, the advantage of the latter mode being that so long as there is water in the reservoir there will be a supply in the pipes, whereas in the former mode if the pumping is interrupted the supply at once fails. The degree of elevation or pressure is in each case regulated by the special Act. In the systems of two companies the statutory pressure is relative, being such as to ensure delivery at a certain height above the street level; in others the pressure is fixed absolutely with reference to a datum; but in the latter case no less than in the former the limit is determined solely with a view to meet the service for domestic supply. Accordingly the statutory limit is not strictly observed, the companies in their own interest frequently giving extra pressure where such is required, or reducing pressure where they can do so without inconveniencing their customers. For instance, the East London Water Company, who may be called on to give such pressure as will conduct the water 40 feet above the pavement, actually give less than that pressure in certain portions of their district; they also give less at certain hours, as at night, when less water is needed for manufacturing and domestic uses, although for the purpose of extinguishing fires water is far more likely to be required in the night than during the day. 4212 B. 4591 B. 4614 B. 3852 B. 3905 B. 4001 B.

65. Similar observations apply to the size of the pipes, which is one of the main conditions that determine their delivering capability. Their dimensions are fixed solely with a view to the demands made on the companies by their consumers. There are in the Metropolis, notably by the river side, many warehouses, which, from their requiring only a small quantity for daily use, are supplied through an extensive length of narrow pipes intermittently charged at low pressure, although from their extreme height, and from the vastness of their contents, 4306 B.

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contents, at once precious and highly combustible, these same buildings more than others ought to be protected from fire by means of a high-pressure supply delivered through large pipes, either themselves constantly charged, or in close proximity with mains.

66. Speaking generally, there are two modes of drawing water from the pipes for the extinction of fires, viz., plugs and hydrants. The subject of hydrants will be dealt with in a later part of the Report. For the present your Committee would confine their observations to fire-plugs, which alone, with few exceptions, are used in the Metropolis.

67. A plug, as its name denotes, is a stopper, usually made of wood, driven fast into a hole made for the purpose in a water-carrying pipe. The stopper is drawn when water is wanted, and replaced when enough has been obtained. Drawing the plug is a comparatively simple operation which can be done by the fireman, if (as is generally, but not always, the case) he knows where the plug is placed. The fireman accordingly always carries with him tools for that purpose. The plug, however, cannot be replaced whilst the water is flowing, by reason of the pressure being too strong. The water has first to be turned off, and this can only be done by the turncock.

68. Plugs are not used on mains, in the Metropolis at least, on account of the pressure; the plugs employed are on the service pipes. A plug, as above described, merely releases the water; and in order that the water may be used, a fire-engine, whether worked by hand or steam, is requisite, and has to be brought up to the spot. The water is either allowed to flow out on the ground and then dammed up into a pool, or is made to run into a portable cistern carried by the fireman for the purpose; from this pool or cistern the engine feeds itself through its suckers, and by means of its power projects the water through a hose to the requisite height on the burning building. Occasionally a standpipe or dummy is forced into the plughole for convenience; but however the engine is supplied under the plug system, an immense quantity of water always runs to waste.

Appendix, p. 664.

69. The fixing of plugs on the pipes was originally assigned to the churchwardens of the several parishes as the local authority at that time charged with the duty of extinguishing fires. Subsequently, by the Waterworks Clauses Act, incorporated in the Special Acts of the company, the churchwardens were empowered to require the companies, at the expense of the parish, to fix fire-plugs at convenient intervals.

28 & 29 Vict. c. 90, s. 32.

70. By the Fire Brigade Act all these powers of local authorities as to fire-plugs were transferred to the Metropolitan Board, to whom they now belong. The same statute also expressly enacted that each water company should provide, at the expense of the Board, on any mains or pipes within the Metropolis, plugs for the supply of water in case of fire, at such places, of such dimensions, and in such form as the Board might require.

15 & 16 Vict. c. 84, ss. 17 and 18, as amended by 34 & 35 Vict. c. 113, s. 49.
28 & 29 Vict. c. 90, s. 32.
28 & 29 Vict. c. 90, s. 12.

71. The Acts authorise the firemen to act where they can without the intervention of the companies' turncocks. With this view the companies are bound to keep for inspection maps showing their pipeage and the spots where the screw-cocks are placed for regulating the service, and if required must give extracts or copies to the Metropolitan Board; they must also deposit keys of the fire-plugs at places prescribed by the Board, and the firemen belonging to the brigade may use these plugs as they may deem necessary for the purpose of extinguishing any fire, and may cause water to be shut off in order to procure a better supply or pressure at the point where delivery is required. To a great extent, however, these powers and provisions are unavailable, by reason of the intermittent character of the water supply, the absence of appliances for obtaining direct access to the mains, and the complexity of the pipage system. Practically, the firemen are dependent on the turncock to turn on the water at the required point, to shut it off from other points for the purpose of obtaining a fuller delivery, and to shut it off altogether when the fire is extinguished, in order that the plug may be replaced.

72. Such then being the system of fire-plugs in use in the Metropolis, your Committee would point out that it is one which, however worked, must always be unsatisfactory. It is wasteful of water; and waste of water means a corresponding

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sponding waste of power of delivery from the pipes. It cannot take advantage of the constant supply in mains (which, even under an intermittent system are generally kept filled), because plugs cannot be used on mains. It cannot take advantage of any pressure that there may be on the water in excess of what is necessary to feed the engines, indeed any extra pressure only adds to the waste of water. But these drawbacks are insignificant by the side of the fundamental defect that the system does not admit of anything being done towards extinguishing a fire, until the firemen have arrived at the spot with the engine, and in most cases the turncock also. With the utmost promptitude the arrival of the firemen and the turncock cannot take place until after the lapse of a considerable number of minutes.

73. This defect is of vital importance, is inherent in the system, and, beyond a certain point, incurable.

74. The matters then for consideration seem to be how far the evils of the system are mitigated by the efficient arrangements on the part of those concerned in working it, the Metropolitan Board and the water companies, and whether it is practicable to introduce a superior system as a substitute.

75. With respect to the Metropolitan Board, the constitution of the brigade has been already described; it is sufficient here to repeat that a considerable addition to the number of men, stations, and engines is beyond question indispensable, if the force is to be rendered adequate to the working of the system in which it is engaged.

76. With respect to the water companies, in past years complaints were made against them by the Metropolitan Board that the turncocks were often behindhand, and that the supply of water was insufficient. The companies had much to say in their defence; but, at all events, these complaints have of late abated. The companies appear to have taken pains to secure the prompt attendance of the turncock; and usually the turncock arrives before the firemen. In the year 1875 there were only four cases in which short supply of water was made the subject of a formal report by the brigade. And, generally, it seems to your Committee that the companies cannot be charged with any failure of duty.

77. But this does not mean that, in the judgment of your Committee, the arrangements are satisfactory; on the contrary, there is abundant evidence of the prejudicial effects resulting from want of concert between the Metropolitan Board and the companies, and from the several companies being independent of each other, under no statutory obligation to co-operate in the extinction of fire, and, indeed, scarcely justified by their constitution in incurring expenditure for that purpose. Thus the turncock does not, as at Liverpool, live at the brigade station, and accompany the engine to the fire; there is no provision for communicating with him by telegraph, nor is it even recognised as the duty of the brigade to see to his being summoned. And though it may seldom happen that the supply of water is so short or so tardy as to disappoint expectations formed on the known limits to the capabilities of the companies, and therefore to constitute a legitimate ground of complaint, it is obvious that the engines of the fire brigade would be able more speedily to suppress fires, if the water supply were constant instead of intermittent, and if the pipes were larger and the pressure higher.

Appendix No. 9, p. 640.

1086.

1081, Shaw.

Kent, 4219 B.

Middlesex, 4481 B.

78. To pass now to the consideration of the other alternative, hydrants.

79. Hydrants vary much in their construction; but for present purposes a hydrant may be roughly described as an appliance permanently attached to the water-carrying pipe, so constructed as to give direct communication with the water by means of opening a stop-cock, and to admit of a hose being readily and securely screwed on. When water is wanted the hose is screwed on, and the stop-cock opened; the water then flows at once through the hose into the engine, if an engine is used, or as a jet if there is no engine. When enough water has been procured, the stop-cock is shut, and the hose unscrewed. There is no waste, and all the operations, the opening and shutting of the cocks, the screwing and unscrewing of the hose, are of the simplest character.

80. Even as a feeder to an engine, a hydrant is superior to a plug, alike whether

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whether the supply is constant or intermittent. It avoids all waste of water, securing to the full whatever quantity the pipe is able to deliver. It can be attached as safely to a main as to a service pipe, and, as already stated, the mains are, in many cases, kept constantly charged, and of course deliver a much larger quantity of water. Several instances have been brought to the notice of your Committee, where fires have been ineffectually dealt with, from the engines having to wait for a supply in the service-pipes, or from such supply proving insufficient, whilst close at hand was the main, with abundance of water, which could have been immediately available if only there had been a hydrant. What, however, especially distinguishes a hydrant from a plug is that, without the intervention of an engine, it can itself be used as an engine for the purpose of throwing a jet. The water of the pipes, when liberated from the opening of the stop-cock, discharges itself at the end of the hose in a jet, which is capable of being directed by means of the hose towards any given point. The elevation and volume of this jet, and consequently its utility, vary according to pressure and other circumstances.

4046 B.
4049 B.
4061, 4063,
4065 B.

81. As already stated, the earlier acts contemplated fire-plugs as the means to be used in the Metropolis for the purpose of drawing water from the pipes for the extinction of fires. Hydrants were first recognised by the Water Act of 1871, which in this respect effected two important changes.

34 & 35 Vict. c. 113, s. 34.

82. In the first place, it declared that in that Act, and also in the Fire Brigade Act of 1865, the term fire-plug, and the term "plug" should include hydrants and all other apparatus necessary or proper in connexion with the companies' pipes for the supply of water in case of fire. Consequently it gave power to the Metropolitan Board, at any time and place, whether there was a constant supply or not, if they should think fit to incur the expense, to cause hydrants instead of plugs to be placed on any mains or pipes, the work to be done by the company, but paid for by the Board.

83. The second change effected by the Act was limited to the case where a company furnishes a constant water supply. In that case the company was empowered by notice to call on the Board within two months to exercise their power of specifying to the company what plugs or hydrants were to be put up in any part of the companies' water limits having a constant supply; and if the Board failed to make this specification within two months, power was given to the company, if they thought fit, to provide in and for that part of their water limits such plugs or hydrants for supply of water in case of fire at such places, of such dimensions and in such form as to the company might seem necessary or proper, the cost of providing all such plugs and hydrants to be at the expense of the Board.

84. The complaint of the water companies is that these enactments have been frustrated by the persistent refusal of the Metropolitan Board to take advantage of them. The mains throughout the Metropolis are, in many cases, kept constantly charged; and two of the companies, the East London Waterworks Company and the Kent Waterworks Company, are, by degrees, extending constant supply over their service systems; but notwithstanding this, and in spite of frequent representations, the Board have declined to adopt the hydrant system. In only one instance have they voluntarily set up hydrants, viz., in the new street recently constructed under the name of Northumberland Avenue. In two other instances action has been forced upon them. The Kent Waterworks Company, on extending the constant supply to Rotherhithe and Deptford, gave formal notice to the Board, in pursuance of the Act of 1871, and thereupon the Board erected certain hydrants. More recently the same company gave a similar notice respecting the Plumstead District, and on the Board abstaining from taking action during the prescribed period, put up 60 hydrants, the cost of which, in accordance with the Act, has been defrayed by the Board. Similar applications have been made by the East London Waterworks Company, but have been disregarded by the Board.

4114 B.

85. The companies contend that there is nothing to prevent hydrants being successfully used as substitutes for engines, or as auxiliaries to them, at all events wherever constant supply is given; that fire-plugs are an antiquated and inferior device for procuring water for fire-extinction, and that their continued use

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use is contrary to the interest of the metropolitan ratepayers, whose property it is the duty of the Board to protect by the most efficacious means. The companies also feel specially aggrieved at the adherence to a system which wastes their water unnecessarily, diminishes the available pressure, and exposes them to the charge of not providing sufficiency of water at places where an ample supply might be immediately drawn by means of hydrants placed on the constantly-charged mains.

86. The Board, without questioning the superiority of hydrants where the conditions are favourable to their employment, deny that these conditions are to be found under the present constitution of the metropolitan water supply. They consider that under existing circumstances hydrants would be but a doubtful advantage; at all events, not one equivalent to the enormous cost which would be entailed by a change from one system to another.

87. The questions, therefore, that present themselves are these:—What are the conditions necessary for the effective employment of hydrants; to what extent are these conditions satisfied under the existing system of metropolitan water supply; and what would be the cost of providing hydrants? It will be more convenient to consider the last question first.

88. The cost of adopting a system of hydrants depends on the cost of each hydrant and the number of hydrants required. With respect to the cost of providing and fitting a hydrant, a variety of circumstances have to be taken into consideration. Much would turn on the character of the hydrant itself, according as it is simple or elaborate in construction; much on whether any extra work, as the construction of a small branch to receive the hydrant, is required; much on whether the hydrant is to be affixed to a pipe already laid down, a process entailing not only extra work on the pipe, but the necessity of breaking up the road and making it good again, and the expense of this latter operation itself varies according as the material of the road is earth, pavement, wood, or asphalte, and as the road is a crowded thoroughfare or otherwise, for in a crowded street special precautions and night-work at extra pay are indispensable. How wide is the range of cost may be estimated from the fact that the simplest hydrant, as used at Manchester, by itself can be procured for the sum of 1 *l.* 10 *s.* 8 *d.*, whereas the expense of providing, fitting each hydrant, and doing the necessary work in connexion with it in the City of London, will probably amount from 25 *l.* to 30 *l.* In the case of the Metropolis, the additional cost resulting from the hydrants having to be affixed to pipes already laid down would be unavoidable, and in some streets the special difficulties would be as great as in the City. On the other hand, there are many parts of the Metropolis in which the work would be of an inexpensive character. 7879. 506 B.

89. With respect to the number of hydrants required, it is difficult to form any trustworthy estimate from the length of the actual pipeage in the Metropolis, or from comparisons of the area and population of the Metropolis with those of provincial towns where hydrants have been adopted. It is certain, however, that throughout the parts covered with continuous buildings, as distinguished from the comparatively rural portions, hydrants must be placed at short distances from each other, since every additional length of hose attached to a hydrant greatly weakens its powers of discharge; and to ensure success it is necessary that there should be the means of bringing several hydrants to bear on the fire at once. The number, therefore, of hydrants required for the entire Metropolis could not fail to be very large. The gross cost was estimated by different witnesses at sums varying from a quarter of a million to a million, but this sum would of course be greatly reduced if for the present hydrants were to be placed only on such mains and service-pipes as now receive a constant supply. 5866, 5867.

90. Next as to the conditions necessary for the effective employment of hydrants. This question your Committee propose in the first instance to consider as it was presented by the witnesses on behalf of the Metropolitan Board, who directed their evidence to the availability of hydrants, not as feeders to fire-engines or as appliances to be used before the arrival of the engines, but as a complete substitute for them. The first condition which was specified as necessary for this purpose was that of constant supply. Not that constant supply has

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has any bearing on the force of the hydrant, an intermittent supply, when once water is obtained, being equally effectual in this respect. Under the intermittent system water cannot be obtained without the help of a turncock; and the interval of time requisite to enable a turncock to arrive is sufficient to enable a fire-engine to arrive also; and a fire-engine, once on the spot, leaves nothing for the hydrant to do, except to feed the engine.

91. Next it was urged hydrants must be able to throw a jet sufficient in height and volume to reach and extinguish any fire with which they may have to deal. The necessary height will be the height of the tops of the houses and buildings in the street, and would vary, therefore, from 50 to 80 or 90 feet, or even more, above the level of the pavement. The volume which Captain Shaw declares to be necessary in the case of a large fire, is a discharge at the rate of 2,000 gallons per minute, to be distributed through 12 or 14 engines or hydrants. This may be taken as the maximum. Now, the height and volume of a jet are regulated by certain hydraulic laws which cannot be adequately expounded except in a scientific treatise, and are very difficult even for experts to apply to the varying and complex circumstances of each case.

92. The general result, however, of the evidence given on behalf of the Board was that the conditions to be realised before a system of hydrants can be relied upon as a substitute for fire-engines are, constant supply, high pressure concentrated on the point of delivery, pipes sufficient in diameter and traversing a moderate distance, and hydrants disposed at narrow intervals so as to be available without an excessive length of hose.

93. These conditions are admitted to be realised with marked success in some provincial towns which possess special local advantages in respect of water supply, and which have had their pipage laid down with a view to the use of water not only for consumption, but for the extinction of fires. Such is the case at Liverpool, Manchester, and Brighton, where the waterworks are in the hands of the corporation, and arrangements exist for immediately bringing to bear the highest available pressure, and the police are employed in working the hydrants. Engines are not discontinued, but they are reduced in number, and used chiefly by way of reserve. In Manchester it appears that in only 3 per cent. of the fires is it found necessary to call in the engines.

Liverpool, 7474, 7475. 7573. 7689.
Manchester, 7362, 7363. 7389. 7394. 7396.
Brighton, 6023, 6026. 6030. 7399.

94. The conditions are also realised beyond question in parts of the Metropolis. In the City of London, where the supply from the New River Company is intermittent, but the mains are constantly charged, the Corporation have already erected some hydrants, and are about to adopt the system more extensively. Their first commencement was in the Holborn Valley District; when carrying out in that district the recent Improvement Act, which compelled them to lay down new pipes, they took the opportunity of supplying the new mains with hydrants, and Captain Shaw appears to be satisfied with their efficacy. At the present time the Corporation are engaged in establishing hydrants at their own expense in one of the six police districts of the City, and from experiments made they have good reason to believe that these hydrants will give a jet which will be thoroughly serviceable in respect of both height and volume; and if the result proves successful hydrants will doubtless be extended to the whole of the City. With respect to the work now in hand, the arrangement is that the hydrant shall be placed either on the main itself or (in the case of streets which are without a main) on a branch which the Corporation lays down for the purpose. The cost of making and laying of each branch is about 16 *l.*, and the cost of each hydrant of the form which has been provisionally adopted is 6 *l.* 16 *s.* 3 *d.*; so that the total cost of providing and laying down such a hydrant will probably amount to from 25 *l.* to 30 *l.* The pressure given by the New River Company is greater than that of any other company, and is about to be enlarged by the addition of 50 feet head available in two-thirds of the City. The mains are large, and the branches having been constructed expressly with a view to the use of hydrants, are of sufficiently large dimensions, and of not excessive length; indeed, the area of the entire City is only one square mile. The cost of laying down the hydrants is comparatively much higher than would be requisite elsewhere, whilst the value of property in the City warrants an exceptionally large expenditure.

760 B. 770 B. 476 B. 486 B. 779 B. 791 B. 904 B. 821. 775 B. 864 B. 506 B. 811 B. 829 B.

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95. In the Temple, which is likewise supplied by the New River Company, the Inns of Court have lately caused hydrants to be established, but as a preliminary step they deemed it necessary to construct a new 7-inch main to connect with the 12-inch main in Fleet-street and the 7-inch main in Whitefriars, and attached to the main in the Temple branches to which the hydrants are fixed. The hydrants themselves, and their fixing, cost on an average 4 *l.* 3 *s.* 3 *d.* a-piece, and from the experiments made it is the belief that they can throw a jet sufficient both in height and volume. 672 B. 677, 678, B. 680 B. 703 B.

96. In parts of the district belonging to the Kent Waterworks Company hydrants have been laid down systematically. The earliest were those at Greenwich and Woolwich, erected before the transfer of the brigade to the Metropolitan Board, and at the request and cost of the local authorities. Greenwich Hospital, Woolwich Dockyard, and Deptford Victualling Yard are all efficiently hydranted, a suitable main having been laid down for the purpose. Further, as already stated, thirty hydrants have been erected by the direction of the Metropolitan Board in Rotherhithe and Deptford as the constant supply system was extended to these districts. Of these the first 11 were of different kinds and prices, selected with a view to experiment; the remaining 19 cost 4 *l.* 15 *s.* a-piece; these were tried in the presence of Captain Shaw, and the results pronounced satisfactory; and more recently Plumstead district has been hydranted by the same company, at the expense of the Board, each hydrant costing (without a stand-post), on the average 3 *l.* 6 *s.* 11 *d.* 4029 B. 4288. 4230. 4241. 4247 B. 4114 B. 4155 B. 4179, 4182 B.

97. Nor is there reason to doubt that there are many other districts in the Metropolis where hydrants could be used as engines if affixed to mains, or even to service-pipes. Your Committee, however, are of opinion that this cannot be taken to be the case with the Metropolis at large. The service-pipes are often so small in diameter that the utmost pressure within the range of possibility would fail to give a jet at all corresponding to that of an engine. In other cases the pipes may be large enough; but the existing pressure, though adequate for the purpose for which it is designed, would be insufficient for the purposes of a jet.

98. The proposition, therefore, of the Metropolitan Board that, taking the Metropolis as a whole, hydrants, under the present conditions of water supply, cannot do all that is required of fire-engines, is one which is to be accepted. To argue, however, from this that no hydrants should be used, but only fire-engines, seems to your Committee to mistake the problem to be solved. The object is not how to deal with fires at their height, but how to quench them at the outset. For the former, engines will always remain necessary; but for the latter they are not available. The engine is at a distance, has to be sent for, and to come; with the utmost expedition it cannot be brought to bear until after the lapse of many minutes. In the meantime valuable property is being burnt, and what was a small fire has become a large one, perhaps a conflagration. A hydrant, on the other hand, is on the spot, and ready for instant service. That it is not so strong as a fire-engine is not a fatal objection; in most cases not an objection at all. The volume which it can discharge may be small, but if promptly used will suffice to extinguish the fire, or to keep it down until the arrival of the engines. So, again, the jet may fall far short of the roof of a house; but the fire is not always at the roof. If the hydrant can throw a jet on the third, second, or first floor, it may do all that is required; and by mounting a ladder or fire-escape with a hose, the person in charge of the hydrant may be able to deliver water through the window at a place unattainable by a jet from the ground. But even as a mere carrier of water to the door of the house the hydrant renders most important service, as by this means hand-pumps can be at once set to work. The efficacy of hand-pumps so used is fully proved by the experience gained at Manchester, where 72 out of 308 fires were extinguished by hand-pumps. In short, the advocates of the hydrant can appeal to what has been well called the axiom of fire extinction, that small means, promptly exerted, are more efficacious than more powerful appliances at a later stage; such axiom depending on the obvious fact that every fire begins by being a small one, and can then be easily dealt with, whereas if unchecked it rapidly gains head, and before long becomes uncontrollable. 6775.

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99. But an essential condition to the utilization of hydrants is, that there should also be on the spot persons ready and competent to work them. If left to be worked by the firemen arriving with the engine, they would usually be superfluous, except as feeders to the engine. But this condition would be perfectly satisfied by police constables being appointed to the duty, and such an arrangement would naturally form part, and indeed constitute the chief value of the recommendation we have already made for the incorporation of the fire brigade with the police. Provided, therefore, that recommendation be accepted, your Committee are prepared to advise that throughout the Metropolis hydrants should be placed on mains and service-pipes wherever a constant supply is given.

100. The outlay requisite for this purpose would undoubtedly be large, but, in the opinion of your Committee, the ratepayers as householders would be fully compensated by the increased security to their property.

101. But whilst recommending that the hydrant system should be introduced without delay, and extended to the utmost practical limits, your Committee have to observe that it is impossible for the hydrant system (or, indeed, the fire-engine system) to be worked to the full advantage unless important improvements are effected in the metropolitan water supply; and the question at once arises, how far such improvements can be required from, or carried out by, the several water companies as at present established. The improvements to which we refer are, the introduction of constant supply, increase of pressure, and enlargement of pipage.

With regard to the first of these, it is doubtless within the competence of each company to give a constant supply; but it is not to be expected that the companies generally will volunteer to do so, seeing that after this lapse of time six out of the eight companies still adhere to the intermittent system, and the other two have introduced this change only in parts of their districts. Nor is it likely that either the Metropolitan Board or the Local Government Board will exercise the powers they possess, under the Act of 1871, to make requisition on the companies.

102. With respect to pressure and pipage, it may be taken that the companies already acquit themselves of their statutory duties, the pressure given and the pipes used being now sufficient for the domestic supply, to which alone the obligation extends. But to make the system of each of the water companies self-sufficient, so that hydrants wherever placed will give a jet of the requisite volume, would require a very large outlay; new reservoirs would have to be constructed, or additional pumping power provided for engines, small or thin pipes would have to be replaced by large and strong ones, and house fittings would have to be strengthened. Your Committee are of opinion that the companies cannot be called upon to undertake this expense for the purpose of fire extinction, an expense from which they would derive no profit. No doubt want of pressure, and even of sufficient pipage, could, to a certain degree, be met by combination between the different companies; but even this would involve fresh legislation, expense in establishing the necessary connections and in strengthening the pipage to receive the increased pressure, and, above all, such constant concert in working the arrangements as to pumping, use of the water, &c., as could scarcely be maintained between different companies having conflicting interests.

103. Your Committee are thus brought to the conclusion that the water supply cannot be made to afford the full measure of protection which the Metropolis should possess against fire until it is consolidated in the hands of a single authority, conducting the business, not for immediate profit, but for public convenience, and placed under a statutory obligation to provide jets of water sufficient for fire extinction, as well as a supply for domestic consumption. Your Committee, however, feel that they would be exceeding the bounds of this inquiry if they expressed any opinion as to the conditions on which such transfer from the companies could best be effected, or as to the question what should be the new water authority; or as to the numerous other points of importance which are necessarily involved in a proposal for so complete a reorganization of the water system of the Metropolis.

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104. But they deem it necessary to observe that whilst the general result of such a concentration of management as they have indicated would be to secure an effective means of extinguishing fires, and thereby diminish the losses of the Metropolis, the several changes above mentioned in the system of water supply, would be capable of being carried out with much less difficulty and expense if unity of control and consolidation of public interests were allowed to supersede the separate action of the various water companies.

V.—INSURANCE COMPANIES.

105. As already stated, on the passing of the Fire Brigade Act, the insurance companies transferred their stations and plant to the Metropolitan Board. This is their only contribution towards the capital outlay on the brigade, the ratepayers having found all the rest of the capital, now amounting to 190,000 *l.* But towards the income of the brigade the companies have from the first annually contributed at the rate of 35 *l.* in every million assured; and from the increase of insurance business the yield of this contribution has swelled from 11,050 *l.* in 1866 to 18,093 *l.* in 1875, and now is more than one-third of the contribution from the rates. Some of the witnesses on behalf of the Metropolitan Board, who were examined before your Committee, represented that if it were deemed necessary to make a large addition to the stations, plant, and numerical strength of the force, and for this purpose to borrow further capital on the rates, and remove the the limit of $\frac{1}{2}$ *d.* on the rate annually imposed on the ratepayers, the rate of contribution from the insurance companies should be increased also.

106. The insurance companies, it was represented to your Committee, do not ask to be relieved of their present contribution, being willing to acquiesce in the *status quo* as a compromise of long standing; but if it is proposed to augment their burden, they claim that the whole matter should be reconsidered on principle.

107. Your Committee have come to the conclusion that no sufficient cause has been shown for augmenting the rate of contribution from the insurance companies; but they think that on the same principle as that carried out in the local Acts relating to Liverpool, Manchester, and some other provincial towns, a charge should be imposed on owners of uninsured property which has been saved from fire.

VI.—THEATRES.

108. In pursuance of the instruction that your Committee should have power to take evidence, and report with special reference to better means of preventing loss of life and property from fire in theatres, and other places of public amusement,—Your Committee hav ereceived evidence from the Lord Chamberlain, the permanent Secretary of his department, Mr. Ponsonby Fane, and the architect officially consulted by that department; from Mr. Pownall a member of the Middlesex Bench, who are a licensing authority for music halls; from the Superintending Architect of the Metropolitan Board of Works, who administer the Metropolitan Building Act; from Captain Shaw, as representing the Fire Brigade; from Mr. Edwin Chadwick, on behalf of the Society of Arts, and from Mr. Penrose and Mr. Phipps, who, as architects, were qualified to speak with professional experience; from the proprietors or lessees of the Court, Criterion, Folly, East London, Pavilion, and Gaiety Theatres; from the proprietor of the Canterbury Music Hall; from the architect in charge of Exeter Hall, and from Mr. Mitchell, one of the committee of management of the Sacred Harmonic Society, who give their concerts in that building.

109. They have also consulted the Report of the Select Committee of the House of Commons which inquired into the subject of theatres in the year 1866, and they have had laid before them the Report of a Special Committee of the

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Society of Arts on insecurity from fires and panics at theatres and places of public resort, which, amongst other valuable matter, contains the legal regulations enforced in theatres in Paris. Your Committee have further had the advantage of considering the recommendations made by the Brooklyn Committee after the great fire in that theatre in New York.

6 & 7 Vict. c. 68.

110. All theatres, with the exception of two patent theatres, Drury-lane and Covent Garden, are annually licensed under the Theatres Act. The Lord Chamberlain's sanction is required before a play can be performed in any theatre, wherever situated; but his licensing jurisdiction is limited to such theatres as are within the boundaries of the metropolitan boroughs as they existed at the passing of the Theatres Act, or are in Windsor or Brighton, or any place where the Sovereign occasionally resides, during the term of such residence.

1776 B.
1852 B.

111. Theatres in other parts of the Metropolis (as the Court Theatre, at Chelsea), and in the provinces, are licensed by justices in Special Sessions of the Division.

Section 8.
Section 9.
Section 19.
Section 7.

112. The Act is silent as to the construction of theatres. The Lord Chamberlain has no power to make rules for any purpose, but in case of riot or misbehaviour he may suspend the license of any licensed theatre, or cause a patent theatre to be temporarily closed. The justices have power to make rules, and the Secretary of State may rescind or alter them; but these rules are only for insuring order and decency, and regulating the times when the theatre may be opened. In case of either riot or breach of the rules, the justices may, by a summary order, close the theatre. No power is expressly given to impose penalties; but the Act provides that penalties for breach of the rules may be recovered either by action or summary prosecution before justices, and requires the manager to be bound in a penal sum not exceeding 500*l.*, and two sureties for a sum not exceeding 100*l.*, for securing the payment of such penalties. This last requirement apparently extends to the case of a license from the Lord Chamberlain; but this is to be explained by the fact that the Bill when brought in contained a power (which was afterwards struck out in Committee) enabling the Lord Chamberlain to make rules for regulating the times when the theatres under his jurisdiction might be opened.

113. Neither the Lord Chamberlain nor the justices, therefore, have any means of controlling the construction of a theatre, or other arrangements for protection against fire, except by exercising their power to refuse the grant or renewal of a license, and this course is practically inapplicable, as the result would be not only to inflict an excessive punishment on the proprietor, but to throw out of employment a large number of persons dependent on the theatre, and greatly to inconvenience the public.

Appendix, No. 3*B.

114. The number of theatres licensed by the Lord Chamberlain has grown from 25 in the year 1866 to 38 in 1877.

1275 B.

115. The practice in the Lord Chamberlain's office, before granting a license, is to require the plans to be approved by an architect named by the Lord Chamberlain, and the building to be constructed in accordance with the plan so approved. In the case of old theatres, suggestions are made from time to time, and when they undergo extensive alterations, the opportunity is taken to require improvements with a view to safety. Regulations, so called, for the conduct of the theatre, including proper provisions to be taken against fire, have always been issued, but only lately in print. Once a year, before the license is renewed, on a day of which notice is given beforehand, the theatre is thoroughly inspected by Mr. Ponsonby Fane and an architect, in order to ascertain whether the regulations have been complied with; but beyond this, there is no inspection except under special circumstances, the Lord Chamberlain's office (the expense of which is defrayed from the Civil List) not having attached to it any staff available for the purpose.

Appendix 2 B.
1093 B. 2011. 2039.
1044 B.

2505 B.
Appendix 4 B.
1901—1903.

116. The theatres licensed by justices in the parts of the Metropolis outside the jurisdiction of the Lord Chamberlain are six in number, if the theatres at the Crystal Palace, Alexandra Palace, and North Woolwich, which are in the management of London Companies, are taken into account. In the case of the Court Theatre at Chelsea, it would appear that the Chelsea justices made no requirement

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requirement as to its construction previous to granting the original license, nor caused any inspection subsequently to be made until recently, when after the disastrous fire at Brooklyn Theatre had called attention to the subject, the Chairman of the Chelsea Bench, and the surveyor of the district, inspected the Court Theatre, and made certain requisitions with a view to increased safety, which the proprietor has complied with. The proprietor is also furnished with a copy of the Lord Chamberlain's regulations, which are taken to have been adopted by the magistrates. 1928, 1929.

117. Music halls, by which are meant places used for public music and dancing, or music alone, are not required to be licensed, unless within the City of London or Westminster, or a circuit of twenty miles, those being the limits of what is known as the Music and Dancing Act, 25 Geo. 2, c. 36, which is aimed at the suppression of disorderly houses in the Metropolis. The licensing authority under the Act are the County Quarter Sessions.

118. Music halls are distinguished from theatres, by the rule that no stage plays may be performed in them. They vary much in size, an ordinary public-house being equally qualified to be licensed with Exeter Hall or Canterbury Hall, which are capable of containing several thousand persons. For the smaller halls special regulations for the prevention of fire would be unnecessary and oppressive; but in the case of the larger halls where the public are accustomed to congregate in great numbers, precautions are requisite almost as much as in theatres; the risk of fire from without is the same, and if a fire were to break out, or a panic to arise, the disastrous consequences to the public assembled would be equally great. The chief difference is that theatres are more exposed to the risk of fire from within by reason of the shifting of the scenery and lights, and the storage of stage properties and other inflammable goods in the various rooms of the building; and also have more complicated arrangements for the accommodation of the public.

119. If the proprietor of a music hall desires to sell spirits or other liquors, he has further to obtain a license from the Brewster Sessions of the Division, a matter that has a bearing on the present inquiry, because whilst numerous means of egress are serviceable in case of fire, the licensing justices under the Intoxicating Liquor Acts object, in the interests of order, to allow a multiplication of entrances and exits in what are practically public-houses on a large scale.

120. The licensing authority under the Music and Dancing Act have no power to affix any conditions to a license or to make regulations; the only option is to refuse the grant of a license or the renewal of a license, as the case may be. In practice, the safety of the building, or the precautionary arrangements against fire, are not among the matters considered by the justices: but usually, before granting a license in the first instance, the justices, or some of them, make a personal inspection of the premises, and if the building is intended to be licensed for the sale of liquor, the proprietor, before the building is erected, can only obtain a provisional license, under the Intoxicating Liquors Acts, by submitting a plan of the building to the justices exercising licensing jurisdiction under those Acts, and obtaining their approval. 1845 B. 1822, 1823, 1826. 2555.

121. From the evidence of Mr. Hollingshead the number of music halls in the Metropolis would appear to be:— Appendix 4 B.

Concert and Music Halls - - - - -	37
Casino - - - - - - - -	1
Public-Houses - - - - - - -	20
Local Halls - - - - - - - -	10
	68

122. The Metropolitan Buildings Act is administered by the Metropolitan Board through district surveyors, the Metropolis (which includes the City) being divided into 62 districts and a surveyor being assigned to each. The surveyors are appointed by the Board from candidates certified as competent by the Institute of British Architects after examination, and are paid by fees. Before a new building is commenced, or an existing building altered, notice has to be given 18 & 19 Vict. c. 122, 3106, 3107. 3053. 18 & 19 Vict. c. 122 ss. 33, 49.

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given to the district surveyor, whose duty it then becomes to enforce the observance of the provisions of the Act, as to frontage, height, and a number of other particulars. To these general provisions theatres and music halls are subject like other buildings; but in addition they are subject to the special provisions applicable to "public buildings," which are defined to mean "every building used as a church, chapel, or other place of public worship; also every building used for the purposes of public instruction; also every building used as a college, public hall, hospital, theatre, public concert-room, public ball-room, public lecture-room, public exhibition-room, or for any other public purpose." These special provisions require that the floors of the lobbies, corridors, passages, and landings, and also the flights of stairs, shall be of stone or other fire-proof material, and carried by supports of a fire-proof material, and further that every public building, including the walls, roofs, floors, galleries, and staircases, shall be constructed in such manner as may be approved by the district surveyor, or in the event of disagreement, may be determined by the Metropolitan Board. Thus, unless dispute arises between the surveyor and the parties, the matter never comes before the Board at all, and with so many surveyors, however competent, wide differences of opinion are inevitable. This has been especially the case as to the question of what is fire-proof material; but in general it may be said that there is no uniformity of practice.

Section 39.

Section 3.

Section 22.

Section 30.

123. The actual condition of theatres with respect to protection against fire necessarily varies in the different cases. The more modern theatres are less open to objection, whilst the situation and construction of the older ones leave much to be desired; but, with perhaps, one exception, every theatre has a separate exit for the box audience, the pit audience, and the gallery audience. Most of the theatres, but not all, are provided with hydrants, in some cases there is no main in the immediate proximity. In some theatres firemen are kept on duty in the building, but for the most part, to make use of an expression quoted by Mr. Ponsonby Fane, the best extinguisher of fire is found to be the carpenter's cap. The rate of insurance varies according to the circumstances, but in all it is very high, much higher than would be necessary if the provisions against fire were perfected. The regulations of the Lord Chamberlain, on the whole, are fairly carried out, but not so thoroughly as would be the case were the theatres constantly inspected, and a breach of the regulations followed by punishment. It is, however, satisfactory to record that during the last 50 years there has not been a single case in which the life of one of the audience has been lost from a fire in a metropolitan theatre.

1161 B.

1256 B.

729, 2373, 2482, 1532, 2575 B.

1083 B.

1273 B.

124. The condition of music halls, especially the older halls, not having been so carefully watched over, appears to your Committee urgently to require improvement.

125. In considering what amendments in the law are necessary, your Committee do not propose to discuss the expediency of any alteration in the licensing authority of either theatres or music halls, as this would open up questions of considerable difficulty which are beyond the range of the present inquiry; nor is such alteration indispensable to insure the improvements they would suggest.

126. The safety of the public from the danger of fire or panic in a theatre or other place of amusement seems to depend on two main sets of conditions, (1) those relating to the building, its position, structure, and arrangements of a permanent character, and (2) those relating to its daily management.

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127. The Lord Chamberlain pressed on your Committee that the licensing authority should be relieved of the duty of considering the first set of conditions, and that this duty should be assigned to some other competent authority, who should certify that the building was qualified in respect of safety, to be used for the purpose for which the licence was sought, and that on this certificate the licensing authority should, if they thought fit, grant the licence; and the proprietors of theatres who were examined before your Committee all concurred that some such certification was highly desirable.

128. Your Committee agree that the examination into the safety of the building is a function which should not rest with the Lord Chamberlain or justices, neither of them possessing the requisite staff, and there being objections to the creation of a staff for the purpose of performing duties which would be only

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only occasional. The Metropolitan Board naturally suggests itself as the appropriate authority, being accustomed to the administration of the Metropolitan Building Acts, and already commanding the services of a large staff of competent architects. The Lord Chamberlain inclined to prefer a Government department, which would certify theatres much as the Board of Trade, through their inspectors, sanction the opening of railways for traffic.

129. Your Committee, however, are unable to adopt this proposition, which, in their opinion, would be attended with difficulties. The Government could not undertake this charge for the metropolis alone without being pressed to do the same for the rest of the kingdom, which is out of the question. Theatres and music halls could not, without extreme inconvenience, be withdrawn from the general provisions of the Metropolitan Building Act. Nor do your Committee apprehend that if the Metropolitan Board were appointed the certifying authority, there would be any risk of collision with the Lord Chamberlain or the justices. The functions of the licensing authority would remain just as distinct as they are now, when the Metropolitan Boards is charged with the duty of enforcing the provisions of the Building Act with respect to theatres and music halls, as well as other public buildings. Your Committee are therefore prepared to recommend that the duty of certifying a theatre or music hall as safe should be assigned to the Metropolitan Board, but that this duty should be discharged directly by the Board, acting on their own responsibility, after receiving such professional advice from their architects as they may think expedient, and not be left to the district surveyor, subject only, in case of dispute, to an appeal to the Board. Indeed, your Committee consider that this change should also extend to the administration by the Board of the provisions of the Building Act in relation to public buildings other than theatres or music halls. In order to prevent the hardship which would arise if the applicant first went to the expense of erecting a duly certified building, and then was refused a licence by the Lord Chamberlain or justices, it would be expedient to adopt a system (resembling that now sanctioned by the Legislature for the licensing of public-houses) of provisional licences; that is, licences granted by the Lord Chamberlain or justices, as the case may be, upon an examination of the plans before the building is begun, but not operating until confirmed, and confirmed, as a matter of course, on the production of certificate from the Metropolitan Board that the buildings have been properly constructed, and are duly qualified.

130. The structural conditions and arrangements requisite to meet the danger of fire or panic are mainly regulated by practical considerations, and could only be settled by experts. As a safeguard against fire from without, the building should be isolated, either by an intervening space, or by a wall of proper strength and material. With regard to the interior, in addition to the necessity of substantial fire-proof construction, four points appear especially to require attention: (1.) Subdivision of risk, by separating from each other the various parts of the buildings, rooms, and passages by fire-proof partitions. (2.) Distribution of rooms, with a view to minimise the chance of a fire breaking out; for instance, no room should be constructed above the stage, nor should the carpenter's shop be allowed to be placed above the lights of the gallery. (3.) Facility of egress. The outlets should be numerous and separate; passages should widen outwards, and be large enough to contain a considerable proportion of the whole audience. In these passages no steps should be allowed, or other impediments likely, in case of pressure, to throw down persons or injure them. At the same time arrangements should be made to break the pressure by the interposition of barriers at intervals, or giving an angular direction to the passage: all doors should open outwards. (4.) Hydrants in connection with the mains, and provided with hose, should be placed round the building, and also carried within, capable of throwing a jet to any part of the interior.

131. Regulations giving effect to these conditions should be drawn up by the Metropolitan Board, and, so far as possible, be applied to all new buildings, though absolute uniformity would, your Committee apprehend, be unattainable. Existing buildings would be exempted, but (in accordance with the precedent of the Mines Act and Explosives Act) power should be reserved to the Metropolitan Board, if of opinion that the structure or permanent arrangements were dangerous,

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dangerous, to require the necessary alteration to be made, the proprietor, if he objects, being entitled to refer the matter to abitration. Music halls not capable of containing more, say, than 50 persons, should be exempted altogether.

132. With respect to the daily management of the theatre, naked lights should be protected; inflammable materials should not be allowed to be placed where they are likely to catch fire; the hose and other apparatus should be maintained in good order; the passages should be kept clear, and a plan settled beforehand of what should be done in the case of a fire or panic, each of the employés being instructed as to the place he is to take, and the duties he is to perform, and all being occasionally drilled together for the purpose.

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133. In order to insure these precautions being taken, the licensing authority should be empowered to draw up rules applicable in the one case to all theatres, whether old or new, and in the other to all music halls, except the smaller ones, which would be exempted. Breach of rules should be punished by fine on summary prosecution. Inspection of some sort would also from time to time be necessary; and for this purpose the necessary legal powers should be given. Your Committee do not recommend either that firemen from the Brigade should be constantly present, in order, if occasion should arise, to put into operation the apparatus for the extinction of fire, or that the daily enforcement of the rules of a licensing authority should be assigned to the police. Your Committee are satisfied that these duties can be most effectually, as well as most economically, discharged by the regular employés of the theatre, acting immediately under the eye and orders of the manager, and deem it inexpedient to relieve the managers of any of the responsibility that properly belongs to them.

VII.—CONCLUSIONS.

134. Your Committee would sum up their conclusions as follows:

1. That the statutory arrangements for the extinction of fires in the metropolis, whereby the fire brigade is administered by the Metropolitan Board of Works, two separate police forces exist side by side, and the water supply is sectionally furnished by eight independent companies, are not such as to furnish adequate protection to life and property; and contrast unfavourably with provincial systems, where the fire brigade, water supply, and police are under a single authority; and that consolidation of management, so far as is practicable, is urgently required.

2. That the Fire Brigade should be transferred from the Metropolitan Board to the Commissioner of Police for the Metropolis, so however as to constitute a distinct branch to be placed under the immediate command of a separate Assistant Commissioner, and to be authorised to act within the City of London as well as in the metropolis.

3. That the members of the Fire Brigade should be entitled to superannuation on the same terms as those applying to other constables of the Metropolitan Police Force, liberal provision being made for those now serving in the Brigade.

4. That the police stations and the fixed points should be used as fire brigade stations, or as places where small engines or other appliances should be deposited, and that all police constables, both of the metropolis and City, should be auxiliary to the Fire Brigade, but that, as now, each force should be empowered to act only within its own jurisdiction except on a special requisition.

5. That in lieu of the limit of one halfpenny on the consolidated rate, there should be substituted a limit of a penny rate on the Metropolitan Police District, and that the amount of the Government contribution should be reconsidered.*

6. That

* The words "correspondingly increased" appeared in the first issue of this Report, by a clerical error, instead of the word "reconsidered."

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6. That the contribution from the insurance companies should be continued at the present rate, and that a charge should be levied on owners of uninsured property saved from fire.

7. That hydrants should, without delay, be affixed to mains and service pipes wherever there is a constant supply, and should follow the extension of such supply.

8. That the water systems now belonging to the various companies should be consolidated in the hands of a public authority, which, in dealing with the questions of constant supply, pressure and pipage, should be bound to have regard not only to the convenience of consumers, but also to the requirements for the extinction of fire.

9. That no new theatre or large music hall in the metropolis should be finally licensed until certified that, in respect of position and structure, it satisfies all due requirements for the protection against danger from fire, and that the Metropolitan Board should be the certifying authority.

10. That with respect to existing theatres and halls, the Metropolitan Board should have power to call on the proprietor to remedy such structural defects as appear to the Board to be the cause of special danger, and to admit of being remedied by a moderate expenditure, option being allowed to the proprietor to refer the whole question to arbitration.

11. That with a view to the prevention of danger from fire, the Lord Chamberlain and the justices should be authorised to make regulations as to the management of theatres and music halls under their jurisdiction; that for the purpose of ascertaining whether such regulations are complied with, provision should be made for the inspection of these buildings, and that any breach of the regulations should be punishable on summary prosecution.

12. That effect should be given by the Legislature to these recommendations.

17 *July* 1877.

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PROCEEDINGS OF THE COMMITTEE.

Thursday, 15*th March* 1877.

MEMBERS PRESENT:

Sir Henry Selwin Ibbetson.	Mr. Hankey.
Sir James M'Garel-Hogg.	Mr. Hardy.
Mr. Ritchie.	Mr. Hardcastle.
Mr. Kinnaird.	Mr. Clifton.
Sir Henry Peek.	Mr. M'Lagan.
Mr. Onslow.	Marquis of Tavistock.
Mr. Hayter.	

Sir *Henry Selwin Ibbetson* was called to the Chair.

The Committee deliberated.

[Adjourned till Monday next, at Twelve o'clock.

Monday, 19*th March* 1877.

MEMBERS PRESENT:

Sir HENRY SELWIN IBBETSON in the Chair.

Mr. M'Lagan.	Sir James M'Garel-Hogg.
Mr. Hankey.	Marquis of Tavistock.
Mr. Onslow.	Mr. Locke.
Mr. Forsyth.	Mr. Ritchie.
Mr. Hardcastle.	Mr. Herbert.
Sir Henry Peek.	Sir William Fraser.
Mr. Kinnaird.	

Mr. *Edwin Chadwick* was examined.

[Adjourned till Thursday next, at Twelve o'clock.

Thursday, 22*nd March* 1877.

MEMBERS PRESENT:

Sir HENRY SELWIN IBBETSON in the Chair.

Mr. Forsyth.	Mr. Hankey.
Mr. Onslow.	Mr. Hardcastle.
Sir Henry Peek.	Mr. M'Lagan.
Mr. Clifton.	Sir James M'Garel-Hogg.
Mr. Kinnaird.	Sir Andrew Lusk.
Mr. John Stewart Hardy.	Mr. Hayter.

Colonel *Fraser*, Mr. *James L. Shuter*, Mr. *F. C. Penrose*, and Mr. *Arthur Cates*, were severally examined.

[Adjourned till Monday next, at One o'clock.

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Monday, 26th March 1877.

MEMBERS PRESENT:

Sir HENRY SELWIN IBBETSON in the Chair.

Sir Henry Peek.	Mr. Hankey.
Mr. Forsyth.	Mr. Kinnaird.
Mr. Onslow.	Sir James M'Garel-Hogg.
Mr. Ritchie.	Sir Andrew Lusk.
Mr. Young.	Marquis of Tavistock.
Mr. Clifton.	Mr. Herbert.
Mr. Hayter.	Mr. M'Lagan.

Mr. *William Heywood* and Mr. *William Swanton* were severally examined.

[Adjourned till Thursday, 12th April, at Twelve o'clock.

Thursday, 12th April 1877.

MEMBERS PRESENT:

Sir HENRY SELWIN IBBETSON in the Chair.

Mr. Herbert.	Mr. Forsyth.
Mr. John Stewart Hardy.	Mr. M'Lagan.
Mr. Clifton.	Mr. Hayter.
Sir Henry Peek.	Sir James M'Garel-Hogg.
Lord Lindsay.	Mr. Hankey.
Mr. Onslow.	Sir Andrew Lusk.
Mr. Ritchie.	Mr. Kinnaird.
Mr. Locke.	

Mr. *Spencer Ponsonby Fane* and Mr. *Jethro T. Robinson* were severally examined.

[Adjourned till Monday next, at Twelve o'clock.

Monday, 16th April 1877.

MEMBERS PRESENT:

Sir HENRY SELWIN IBBETSON in the Chair.

Mr. Onslow.	Sir James M'Garel-Hogg.
Mr. Hayter.	Mr. Ritchie.
Mr. Clifton.	Mr. Kinnaird.
Sir Henry Peek.	Mr. Locke.
Mr. Young.	Sir William Fraser.
Lord Lindsay.	Mr. John Stewart Hardy.
Mr. Forsyth.	

Mr. *Charles J. Phipps*, Mr. *John Fish Poonall*, Mr. *John Hare*, and Mr. *Alexander Henderson*, were severally examined.

[Adjourned till Thursday next, at Twelve o'clock.

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Thursday, 19*th April* 1877.

MEMBERS PRESENT:

Sir HENRY SELWIN IBBETSON in the Chair.

Sir Henry Peek.	Mr. Clifton.
Mr. Onslow.	Mr. Kinnaird.
Marquis of Tavistock.	Mr. John Stewart Hardy.
Mr. M'Lagan.	Mr. Locke.
Sir James M'Garel-Hogg.	Mr. Ritchie.
Mr. Hayter.	

Mr. *Maurice Abrahams*, Mr. *John Hollingshead*, and Mr. *Robert Edwin Villiers*, were severally examined.

[Adjourned till Monday next, at Twelve o'clock.

Monday, 23*rd April* 1877.

MEMBERS PRESENT:

Sir HENRY SELWIN IBBETSON in the Chair.

Mr. Onslow.	Mr. Young.
Mr. Ritchie.	Mr. Kinnaird.
Lord Lindsay.	Mr. Herbert.
Sir Henry Peek.	Mr. Hardcastle.
Mr. Hayter.	Mr. John Stewart Hardy.
Mr. M'Lagan.	Sir James M'Garel-Hogg.
Mr. Forsyth.	Sir William Fraser.
Mr. Clifton.	Mr. Locke.

The Right Honourable the Marquis of *Hertford*, Lord Chamberlain (attending by permission of the House of Lords), Mr. *Alfred W. Maberley*, and Mr. *George Vulliamy*, were severally examined.

Adjourned till Thursday next, at Twelve o'clock.

Thursday, 26*th April* 1877.

MEMBERS PRESENT:

Sir HENRY SELWIN IBBETSON in the Chair.

Mr. Onslow.	Mr. Forsyth.
Sir Henry Peek.	Mr. Hayter.
Mr. John Stewart Hardy.	Mr. Kinnaird.
Sir James M'Garel-Hogg.	Mr. Clifton.
Sir Andrew Lusk.	Mr. Hardcastle.
Mr. M'Lagan.	Mr. Ritchie

Mr. *Thomas Mitchell* and Mr. *James Muir*, C.E., were severally examined.

[Adjourned till Monday next, at Twelve o'clock.

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Monday, 30th April 1877.

MEMBERS PRESENT:

Sir HENRY SELWIN IBBETSON in the Chair.

Mr. Onslow.	Mr. Hayter.
Lord Lindsay.	Mr. Stevenson.
Sir Henry Peek.	Mr. Young.
Mr. John Stewart Hardy.	Sir Andrew Lusk.
Sir James M'Garel-Hogg.	Mr. Ritchie.
Mr. Hardcastle.	Mr. Kinnaird.
Mr. M'Lagan.	Mr. Locke.
Mr. Forsyth.	Marquis of Tavistock.

Mr. *Charles Greaves* was examined.

[Adjourned till Thursday next, at Twelve o'clock.

Thursday, 3rd May 1877.

MEMBERS PRESENT:

Sir HENRY SELWIN IBBETSON in the Chair.

Mr. Onslow.	Mr. John Stewart Hardy.
Sir Henry Peek.	Mr. Clifton.
Mr. M'Lagan.	Mr. Ritchie.
Mr. Herbert.	Mr. Forsyth.
Mr. Hayter.	Mr. Kinnaird.
Sir James M'Garel-Hogg.	Sir Andrew Lusk.

Mr. *Charles Greaves* further examined, and Mr. *Alexander Dickson* was examined.

[Adjourned till Monday next, at Twelve o'clock.

Monday, 7th May 1877.

MEMBERS PRESENT:

Sir HENRY SELWIN IBBETSON in the Chair.

Mr. Onslow.	Mr. Clifton.
Sir Henry Peek.	Mr. Locke.
Mr. M'Lagan.	Mr. Stevenson.
Mr. Forsyth.	Mr. Kinnaird.
Mr. Hayter.	Mr. Ritchie.
Sir James M'Garel-Hogg.	Mr. Hardcastle.
Marquis of Tavistock.	

Mr. *Alexander Dickson* and Mr. *Charles Greaves* were further examined, and Mr. *Thomas Hack* was examined.

[Adjourned till Thursday next, at Two o'clock.

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Thursday, 10*th May* 1877.

MEMBERS PRESENT:

Sir HENRY SELWIN IBBETSON in the Chair.

Mr. Forsyth.	Mr. Hardcastle.
Sir Henry Peek.	Mr. Clifton.
Sir James M'Garel-Hogg.	Mr. Kinnaird.
Mr. John Stewart Hardy.	Mr. M'Lagan.
Mr. Hayter.	Sir Andrew Lusk.
Mr. Onslow.	Mr. Locke.
Mr. Ritchie.	

Mr. *Thomas Hack* was further examined.

Mr. *Charles Few* was examined.

Mr. *William Hamlyn* was further examined.

[Adjourned till Monday next, at Twelve o'clock.

Monday, 14*th May* 1877.

MEMBERS PRESENT:

Sir HENRY SELWIN IBBETSON in the Chair.

Mr. Onslow.	Mr. Forsyth.
Sir Henry Peek.	Mr. Young.
Mr. John Stewart Hardy.	Mr. Clifton.
Sir James M'Garel-Hogg.	Mr. Ritchie.
Mr. Hayter.	Mr. Kinnaird.
Mr. M'Lagan.	Mr. Locke.

Mr. *Charles Few* and Captain *E. M. Shaw* were further examined.

[Adjourned till Thursday, July 12th, at Twelve o'clock.

~~*Thursday*~~, ~~12*th*~~ *July* 1877.

MEMBERS PRESENT:

Sir HENRY SELWIN IBBETSON in the Chair.

Mr. Ritchie.	Mr. Hankey.
Mr. Onslow.	Mr. Hayter.
Lord Lindsay.	Mr. Hardcastle.
Sir Henry Peek.	Mr. M'Lagan.
Mr. Clifton.	Mr. Forsyth.
Marquis of Tavistock.	Mr. Kinnaird.
Sir James M'Garel-Hogg.	Sir Andrew Lusk.
Mr. John Stewart Hardy.	Mr. Locke.

DRAFT REPORT proposed by the *Chairman*, read a ~~first~~ time, as ~~follows~~:

"PRELIMINARY.

"1. YOUR Committee have taken a large quantity of evidence during the present as well as in the preceding Session. They have examined as witnesses: Captain Shaw, the Commander of the Fire Brigade, and a representative from each class of engineers and each class of firemen; the Chief Assistant Clerk, ~~the Accountant,~~ and the Engineer of the Metropolitan Board, and Mr. Bramwell; the Vice-Chairman of the Works and General Purposes Committee, the present and a former chairman of the Fire Brigade Committee; engineers and other representatives of the various metropolitan water companies; officers of

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of the London Salvage Corps and of several insurance companies; the Commissioner and Assistant Commissioner of Police of the Metropolis and the Commissioner of Police for the City; Mr. Chadwick, deputed by a Committee of the Society of Arts; also various witnesses capable of giving information as to the systems of protection against fire which are in operation at Brighton, Liverpool, and Manchester, and as to the erection of hydrants in the City of London and the Temple.

"2. Your Committee have referred to the public documents bearing on the subject of the present inquiry, more especially to—

"The Report in 1850 of the General Board of Health on Metropolitan Water Supply.

"The Report in 1862 of a Select Committee of the House of Commons on Fires in the Metropolis.

"The Report in 1867 of a Select Committee of the House of Commons on the East London Water Bills and the operation of the Metropolis Water Act, 1852.

"The Report in 1869 of the Royal Commission on Metropolitan Water Supply.

"The Report in 1871 of a Select Committee of the House of Commons on the Metropolis Water Bill, 1871, No. 2.

"The Proceedings in 1873 of the Board of Trade Commissioners as to Regulations for Constant Supply in the Metropolis; and,

"The Report of a Committee of the Society of Arts, communicated to the President of the Local Government Board, and laid before Parliament.

"II.—ADMINISTRATION OF FIRE BRIGADE.

"*As to the Administration of the Fire Brigade Act by the Metropolitan Board of Works.*

"3. The present brigade was established by an Act passed in 1865, but only commencing to operate on the 1st of January in the following year. 28 & 29 Vict. c. 90.

"4. Previous to 1865 the provision for the extinction of fire in the Metropolis consisted of a force called the London Fire Engine Establishment, voluntarily set on foot and supported by the insurance companies at a cost of about 25,000 *l.* per annum, and of engines, &c., maintained by the several parochial authorities, in pursuance of 14 Geo. 3, c. 78, and the Lighting and Watching Act (3 & 4 Will. 4, c. 90, s. 44). There were also a certain number of fire escapes voluntarily established by the Royal Society for the Protection of Life from Fire. The Fire Engine Establishment, however, provided only for the central parts of the Metropolis where the insured property was mainly situated, and even for that area was insufficient, and, moreover, its continuance was precarious, some of the insurance companies declining altogether to contribute, and the others being in consequence unwilling to bear the entire cost of the brigade. 6500.

"5. In 1862, a Select Committee of the House of Commons had been appointed to consider the matter, and they reported in favour of a brigade to be established under the Commissioner of Police. The Government of that day, however, thought it more advisable that the authority should be the Metropolitan Board of Works, one reason being that the area which the brigade was to serve was to be the Metropolis subject to the jurisdiction of the Board.

"6. It appears that Sir G. Grey, then Home Secretary, who was in charge of the proposed measure, consulted Captain Shaw, who commanded the Fire Engine Establishment, and requested him to submit a scheme and estimate for the new brigade, taking into account the then condition of the Metropolis, its population and area, and the number of houses and value of property to be protected. Captain Shaw's first scheme showed a probable annual cost of 70,000 *l.*, but was set aside as too expensive. The second scheme, with an estimate of 52,000 *l.*, was rejected for the same reason. Captain Shaw was then instructed to frame a third scheme limited to a cost of 50,000 *l.*, as the sum which it was contemplated would be yielded by a ½ *d.* rate on the Metropolis, if reinforced with contributions from Government and insurance companies, Sir G. Grey being of opinion that Parliament would not sanction the imposition of any higher rate on the Metropolis for the purpose of protection from fire. In order that the prescribed limit might not be exceeded, Captain Shaw was instructed not to include in his estimate any expenditure on fire escapes, the taking over of which by the Metropolitan Board it was proposed should be postponed until the progressive yield from the sources of income should put the Board into possession of ampler funds. With regard to capital, an outlay was contemplated of 40,000 *l.*, in addition to the plant and stations of the insurance companies, which were to be transferred to the Board without payment. It was on this basis that Captain Shaw submitted his third scheme, and that Sir G. Grey introduced and carried the Bill. 1212.

"7. The Act declared that after 1st January 1866 the duty of extinguishing fires and protecting life and property in the case of fire should, within the Metropolis, be entrusted to the Metropolitan Board of Works.

"8. The area to be served by the brigade was defined as the Metropolis, *i.e.*, the City, and parishes and places outside the City which are under the jurisdiction of the Metropolitan

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politan Board. This area is smaller than the area served by the Metropolitan police and the City police; smaller also than the area served by the various Metropolitan Water Companies. The Act, however, enabled the Fire Brigade to render for payment special services beyond the Metropolis.

" 9. The Act regulated the relation of the Board and the brigade to the police, and to the water companies, both of whom, it is obvious, exercise important functions with regard to extinction of fires. These matters will be dealt with separately in a subsequent part of this Report; for the present your Committee would confine themselves to the consideration of the manner in which the Fire Brigade has been established and administered by the Board.

" 10. The Board was empowered to purchase, if it thought fit, the stations and plant belonging to the parochial authorities, but the stations and plant of the insurance companies were to be transferred without any payment except the satisfaction of all existing obligations of the companies, including the pensions of any officers already
2979. retired. The mortgages on the stations, it is necessary to mention, amounted to 7,000 *l.*

" 11. In order to meet the capital expenditure requisite to start the brigade, the Board were authorised to raise a sum of 40,000 *l.*, and in the course of 10 years subsequent to the passing of the Act, they on two occasions, received further borrowing powers, the aggregate amount of capital actually borrowed (up to the time when the sittings of your Committee commenced) being 130,000 *l.*, viz. :—

	£.
" Under Fire Brigade Act, 1865 - - - - -	40,000
" Under Metropolitan Board of Works Loans Act, 1869 - - - - - - - - - - -	75,000
" Under Metropolitan Board of Works Loans Act, 1875 - - - - - - - - - - -	15,000
TOTAL - - - £.	130,000

" The whole of this sum has been expended solely in the providing of station-houses, fire-engines, fire-escapes, and permanent plant; no part could have been lawfully applied or in fact has been applied, to meet current expenses properly chargeable to income.

" 12. Before, however, this summary of expenditure can be accepted as representing the powers which the Board, from time to time, during the 10 years possessed of raising capital for the purpose of the Fire Brigade, some further explanation is necessary as to the 75,000 *l.* raised under the Loans Act of 1869.

" 13. By that Act (which instituted the Consolidated Rate, and which was brought in as a Bill by the Government), the Board were enabled to borrow a sum not exceeding 10,000,000 *l.* to cover the aggregate of their then actual and prospective liabilities in respect of main drainage, embankments, and other purposes therein specified, amongst which were those of the Fire Brigade Act.

" 14. The Loans Act, however, did not specify the respective amounts of the several liabilities, and therefore did not apportion the money so authorised to be raised, but the limit of 10 millions, it appears, was inserted after a careful estimate made by the Board, and approved by the Treasury, and in this estimate (the substance of which was read to the House of Commons by the Secretary to the Treasury) the sum set down as that which would probably be required for the purposes of the Fire Brigade was 50,000 *l.* The estimate, however, also left a margin of 136,000 *l.* for contingencies on all undertakings mentioned in the Act, and for minor improvements; and, in the result, the Metropolitan Board, with the consent of the Treasury, drew upon this margin for the purposes of Fire Brigade a sum of 25,000 *l.*, in addition to the sum of 50,000 *l.*, making together a total of 75,000 *l.*

" 15. In raising this sum of 75,000 *l.*, your Committee are of opinion that, regard being had to the demands of their other undertakings, the Board exercised to the full the powers which under the Loans Acts of 1869 were practically available to them for the purpose of borrowing for the Fire Brigade. It is true that the limit of 10 millions was not at the commencement of this inquiry actually reached, and that the provisions in the Act of 1869, the general terms of which were not incompatible with the appropriation of any part of the balance to the Fire Brigade, have not been formally repealed. Practically, however, the balance is entirely pledged for other purposes, and had it been
38 & 39 Vict. c. 75. otherwise, any power to divert it to the Fire Brigade has now been taken away by the indirect operation of the Act of 1875, which enacted that in future annual budgets should be laid by the Board before Parliament, and, in pursuance of this rule, provided for the year ending 31st December 1876, for increasing the capital outlay on the Fire Brigade by a sum not exceeding 15,000 *l.*, redeemable in 30 years; and it is beyond question that since

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since the passing of the Act of 1875, no further money could be borrowed for the Fire Brigade without the consent of Parliament.

"16. Your Committee think it right to mention that, since their appointment, the Board has obtained further powers of borrowing. By the Metropolitan Board of Works (Loans) Act, 1876, it is declared that Section 3 of the Loans Act of 1875 shall be construed as if the amount authorised to be raised up to 31st December 1876, has been limited to 55,000 *l.* instead of 15,000 *l.*, and the Board are further authorised to raise up to 31st December 1877 a sum not exceeding 20,000 *l.* The combined effect of these two enactments will therefore be to add 60,000 *l.* to the capital outlay upon the brigade, making a total of 190,000 *l.* 39 & 40 Vict. c. 55.

"17. With respect to income, the sources prescribed by the Act of 1865 have remained unchanged, except that by the Act of 1869 the interest accruing since that date on the borrowed capital is made chargeable on the Consolidated Rate, instead of being defrayed out of the income of the Fire Brigade. That income, however, has been rapidly progressive from the nature of its sources, as is shown by the following Table : 3872.

ANNUAL YIELD.

SOURCES OF INCOME.	1866.	1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876. (By estimation.)
	£.	£.	£.	£.	£.	£.	£.	£.	£.	£.	£.
1. A sum from the rates equivalent to ½ *d.* in the £. in the Metropolis (now levied by the Consolidated Rate) [3422].	30,913	31,795	33,742	33,869	38,998	38,923	41,606	42,266	42,810	43,514	48,148
2. A contribution from the insurance companies insuring property in the Metropolis, the contribution being at the rate of 35 *l.* in every million on the gross amount insured in the Metropolis [3425].	11,050	11,285	13,794	14,391	14,896	15,442	16,126	16,475	17,097	18,093	18,905
3. A grant voted annually by Parliament of 10,000 *l.*	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000

"In addition, there have been in each year miscellaneous receipts from penalties imposed on occupiers of houses where chimneys have been on fire, from payments for special services rendered beyond the metropolitan limits, and from other minor sources.

"18. The whole of the income thus obtained has been spent upon the brigade. In the earlier years, up to the Loans Act of 1869 (which conferred on the Board further powers of borrowing), a considerable part was applied to what would be more properly capital expenditure, and in 1867 the Board enlarged its operations by taking over from the Royal Society of Protection of Life from Fire the charge of fire-escapes, which, as conducted by that society, required an outlay of 8,000 *l.* or 9,000 *l.* per annum. Nor did the Board obtain for the purpose any additional resources, notwithstanding that the Main Drainage Committee, to whom the question had been referred, had, in the previous year, reported to the Board that the whole, or nearly the whole, of the income of the Board was required for the protection of property, and that if the protection of life was also to be undertaken it would be necessary that the Board should apply to Parliament for further taxing powers. 4170–4157.

"19. From this, amongst other causes, in several instances the accounts of the year showed a deficit which had to be made good out of the income of the succeeding year, and throughout the whole of the period of 10 years the Board have felt themselves more or less hampered for want of means.

"20. But with the one exception above mentioned (as to the relief from the interest on borrowed capital) the Board have made no application to Parliament for authority to enlarge the income of the brigade, being restrained partly by the strong opinion expressed by Sir G. Grey at the commencement as to the necessity of restricting the rate of ½ *d.*, and partly no doubt by a sense of the great demands which they were making on the ratepayers for other and larger undertakings.

"21. With respect to the mode in which these funds have been spent, no complaint was made to your Committee of any wasteful outlay on the part of the Board ; no want of economy can be inferred from contrasting the establishment actually maintained by the expenditure of the present time with the establishment which the estimate of 1865 was expected to provide, a universal rise in prices having taken place since that date ; and

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and apart from the fundamental question as to hydrants, that is to say, assuming that the system of extinguishing fires by means of engines fed by water procured from the pipes through plugs was the proper system to be developed, there is no reason to doubt that the expenditure of the Board has been judicious.

"22. The Board administers the Act chiefly through a special committee called the Fire Brigade Committee, to whom, in exercise of the authority conferred by the Act, it has delegated certain of its powers; but the Board reserves to itself the final settlement of the larger questions, such as the amount of salaries, the purchase of fire engines, and the erection of additional stations, &c., and from time to time refers other matters (*e.g.*, the questions of superannuation and hydrants) to the Works and General Purposes Committee.

28 & 29 Vict. c. 90, s. 28.

4746.

"23. To Captain Shaw is entrusted the disposal and control of the force, and in these matters his discretion is unfettered; he is also present at the deliberations of the Fire Brigade Committee, but he has no voice in their decision.

357. 359. 1717. 3861.

"24. The brigade is recruited exclusively from sailors of the Royal Navy and Merchant Service.

1136, Shaw.

"25. With regard to the efficiency of the force, your Committee are glad to be able to report that there is a general concurrence as to the promptitude, energy, and courage of the men, and as to the skill with which they are handled by their officers.

"26. Statistics were put in by the Board, showing that in the course of the 10 years the promotion of what in the books of the brigade are termed 'serious fires,' as distinguished from 'slight fires,' has been reduced, having fallen from 24 per cent. of the whole in 1865 to 11 per cent. in 1875, and having in 1872 been as low as 8 per cent. It is, however, difficult to attach an exact value to these statistics, both because the expression 'serious fires' is one which it is acknowledged does not admit of a precise definition, and because the number and, to a certain extent, the degrees of fires depend on circumstances over which the brigade has no control.

136.

129. 1170, 71.

"27. The following Table exhibits the actual constitution of the brigade in the year 1875, as compared (1) with the force which it superseded in 1866; (2) with the establishment which Captain Shaw estimated as necessary in 1866 in his third and lowest estimate of the preceding year; and (3) with the establishment which, in the opinion of the same officer, would be needed at the present time, in order completely to meet the requirements of the Metropolis :—

		Area in Square Miles for which Force operated.	Cost.	Stations.			Fire Engines.			Fire Escapes.	Men.		
				Land.	Floating.	Total.	Land.	River.	Total.		Fire Brigade.	Fire Escapes.	Total.
1866	Force taken over from the Insurance Companies.	10	- -	17	2	19	–	–	38	- -	214 (including 85 parish engine keepers.)	–	–
1866	Force as proposed by Captain Shaw in his Third Estimate.	121	50,000	–	–	89 (but of these, 37 were minor stations.)	–	–	129	Not included in Estimate.	351	–	–
1875	Actual Force - - -	121	- -	49	4	53	111	3	114	106	288	130	398
1876	Force which, in Captain Shaw's opinion, would be complete.	121	120,000	–	–	169	–	–	330	200	–	–	931

"28. Your Committee will now proceed to consider the criticisms which have been based on these figures, and the shortcomings that have by various witnesses been imputed to the existing establishment and administration; but at the outset your Committee would wish to guard against a misconception that might arise from the separate treatment of this part of the subject.

"29. The present establishment of the brigade is constituted on the assumption that the entire work of fire extinction, properly so called, belongs to the brigade, unassisted in this respect by the police, and that the only mode of extinguishing fires is the use of fire engines fed by the release of water through plug-holes on the water pipes. If this system is to be maintained, a considerable increase to the establishment of the brigade will, as presently pointed out, be undoubtedly required; but much of this increase would cease to be necessary, and ultimately even large economies might become possible, if the police force and police stations could be utilised, and if the method of fire extinction by means of hydrants could be adopted, two important questions that are reserved for subsequent consideration in this Report. The subject in fact cannot be dealt with satisfactorily, except as a whole.

"30. To

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"30. To take, then, the various points of complaint, in succession :—

"31. The head-quarter station in Watlin-street has long needed to be replaced by another more easy of access, and offering much larger space accommodation. A recommendation to this effect was offered by Captain Shaw in October 1868, and was repeated by him in 1872 and 1875, but the acquisition of such a site was attended with difficulty from financial and other causes. Your Committee are glad to be able to report that since the commencement of this inquiry a site satisfactory to Captain Shaw has been obtained in Southwark Bridge-road.

575. 3186. 3197. 3202. 4832 B.

"32. It was shown to your Committee that in three out of the four districts in which the Metropolis is divided for the purposes of the fire brigade, there are places more than a mile distant from the nearest station. This provision seems to your Committee to be decidedly inadequate, if reliance for the extinction of fire is to be placed exclusively upon the engines of the brigade. Captain Shaw, indeed, went so far as to say that the establishment would not be complete unless the existing number of stations was more than trebled. The insurance companies also specially complained that in several cases stations which were conveniently near for the protection of warehouses, &c., containing large accumulations of insured goods, had been abandoned for stations further off selected for more general but less important considerations. Your Committee are of opinion that these complaints were substantiated in the case of the Farringdon-street and Sloane-square stations.

1318. 608–615, Shaw. 6320. 6393, Lovell. 7096 *et seq.* Swanton. 3502-13, De la Hooke.

"33. Near the river, where there are vast warehouses with an indifferent water supply on the land side, the main provision for extinguishing fires consists of floating engines, and this provision, though much enlarged since the establishment of the force is, in the present condition of the water supply, still very far from sufficient. A plan suggested by the insurance companies in 1871 (of small floating engines having the propelling and pumping machinery on one bottom) was rejected by the Board on the advice of Captain Shaw; in July 1874, Captain Shaw made a new suggestion of steam launches to bring up the rafts quickly to the scene of fire, but no definite action has been taken upon it, chiefly, it would appear, from want of funds.

6445. 2923. 2912. 3435. 2923. 2915. 3436. 2919. 6342.

"34. *Sleeping Quarters.*—Before taking over the brigade the Board, on the 24th of November 1865, came a resolution that for the present, and until further order, the whole of the men to be employed in the Metropolitan Fire Brigade should live at the stations to which they were attached. The stations existing at that time were not such as to admit of this resolution being carried out, and could not in many cases be enlarged. But notwithstanding the above resolution, the new stations built by the Board during the first few years of their administration were not constructed with sufficient sleeping room, the reason being the want of funds. But in the year 1869 the Board, as already stated, acquired further borrowing powers, and the stations erected since that date are all provided with sleeping quarters sufficient for the men who are posted there, and also in the case of firemen belonging to the first and second class for their wives and families. The absence of the same accommodation at the older stations obliging the men to be lodged out in the neighbourhood is detrimental to the service. There are altogether 26 stations where it is necessary to allow extra time for the running out of the engines.

552. 2979. 2980, but *see* 557. 2974. 3515–3520. 4023. 565.

"35. There is no telegraphic communication between the fire-brigade stations and the police stations with two exceptions, Watling-street being connected with Scotland-yard, and the fire-brigade station at Woolwich being connected with the police station at Shooter's-hill.

529, 530.

"36. Telegraphic communication is also absent between the fire-escape stations and fire-brigade stations; fire-escapes are not manned in the day-time, and the number of them (106) your Committee consider to be below the requirements, Captain Shaw recommending that it should be raised to 200.

3840. 6789. 1041.

"37. The strength of the force is, in the judgment of your Committee, inadequate for the work which is now assigned to them to do. If from the total force as now established of 398 men, there be deducted 130 as approximately representing the number employed in fire-escapes, it will be found that the number of men serving the stations and engines in 1875 is less by 84 than the number which Captain Shaw in his lowest estimate of 1866 pronounced as necessary at that time, and this, although in the interval the population of the metropolis has increased 17 per cent, and the accumulation of property to an unknown but certainly enormous degree.

629.

"38. One consequence of the limited number of the brigade is that neither the engines nor fire-escapes can always be worked with that thorough effectiveness that ought to be invariably assured. The proportion of men has to be supplemented as best it may, partly by the improvised assistance of bye-standers, to whom a slight remuneration is made for their services, and partly by extraordinary energy on the part of the firemen engaged, the officers being frequently obliged to divert themselves from what would be their exclusive duty, the superintendence of operations, in order to lend a hand in the performance of rank and file duties.

681.

 "39. Another

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"39. Another consequence is, that when a call is made on a station on account of fire, the station is left weak handed for any further demand, perhaps with only one man to keep up the communication, perhaps with none, and then the station is temporarily closed. A district thus cut off from all means of communication is in a helpless condition; otherwise, however, it is to be remembered that all that is necessary is that each station should be sufficient to deal with the normal requirements of its district; in case of emergency, reliance may fairly be placed upon assistance to be obtained from neighbouring districts, the brigade being so organised as to admit of easy or rapid concentration.

5321. 3916. 4053. "40. A third consequence of the paucity of numbers is to aggravate the lot of those that are employed. It occasionally happens that men are engaged in active and exhausting labour for many hours at a stretch, and in some cases this overwork and want of rest, coupled with exposure, have led to sickness and premature breaking down. But it was completely substantiated that, for want of men, it is not possible to allow the proper amount of relaxation. The men have few nights in bed, and except on special leave, which can be but sparingly granted, they cannot quit the station at any time during the 24 hours, as they must be on the spot to obey a summons which may come any instant. Loss of liberty and long periods of constrained inaction are no doubt inseparable from a fireman's calling, but they constitute its most trying incidents; and the service can hardly be said to be properly organised unless it provides reasonable relaxation. For the want of this the fireman's life is made needlessly irksome, and the popularity of the service seriously impaired. Captain Shaw represented that in order to redress this grievance, it would be necessary to enlarge the brigade by 50 per cent. or 200 men, without any increase of duties; it may perhaps be said that this estimate errs on the side of liberality; but at all events this inquiry by your Committee has already convinced the officers of the Board of the expediency of taking some steps in the matter, and Captain Shaw has now been authorised to employ assistants in the place of all men sick and all men under instruction, a change which has already produced a considerable mitigation.

2947. 3908.

304. 307. 686.

1005.

4997 B.

"41. But the most serious result arising from the short-handedness of the force is, that there is left no reserve at all adequate to deal with any extraordinary emergency such as might happen any day or night, if two or more exceptionally large conflagrations were to take place at the same time. Hitherto the force has proved equal to any strain that has been put upon it, but the total force available at night (after deducting the number of men on escape duty, or station duty, or sick, or under instruction) appears to be under 200 men, whereas in Liverpool it amounts to 100. To meet such contingencies, Captain Shaw would recommend that the force should be increased to 930 men, with a corresponding increase of stations and plant, as already mentioned. Your Committee reserve to a later part of the Report their opinion as to the mode in which this important matter should be dealt with. For the present, they would only point out that Captain Shaw's estimate of the necessary addition was framed on the supposition that the brigade should be self-sufficing.

7581.

"42. *Superannuation.*—A serious grievance put forward by the men was the absence of any provision for superannuation. In the fire-engine establishment, administered by the insurance companies, there seems to have been no regular system of superannuation, but the companies are stated to have been liberal in their dealings in cases where a pension appeared to be deserved. There was, however, a fund called a 'Superannuation Fund,' to which each man subscribed 6 *d.* a week out of his pay, and from which, on retirement, he was allowed (unless he was awarded a pension) to withdraw the whole amount he had paid in, with accumulations; and in case of his death this right passed to his executors. On the Metropolitan Board taking over the stations and plant of the companies' establishment, the men agreed to transfer their services on receiving an assurance from the Board that the arrangement as to the fund should be continued, and that in every case a pension should be awarded to the widow of a man killed in the service. No scale of pension, however, was fixed for these cases, nor did the Board exercise the powers which they had under the Act to make regulations with respect to the compensation to be paid to the firemen in case of accident, or to their wives and families in case of their death whilst in the service, or with respect to the pensions or allowances to be paid in case of retirement.

3005.

4505. 3576. "43. Accordingly the former arrangement as to the superannuation fund was merely continued, except that in the year 1870 the title was changed to 'savings fund,' the subscriptions being regularly invested in metropolitan stock, and the interest accumulated. As a fact, only three firemen have been killed in the service. In two of these cases the men were unmarried, and nothing was given, though in one of them the father of the deceased made an application representing that he had been partly dependant on his son's earnings. In the third an allowance was awarded for a year to the widow, but was then stopped, because the public had raised a subscription of 1,775 *l.* for the family. In the case of firemen dying in the service, gratuities varying between 10 *l.* and 40 *l.* have been given, but only where a widow or children had to be provided for. And, in addition, 5 *l.* is allowed for funeral expenses, whether the fireman died or was killed in the service.

See pp. 629, 630 of Appendix.

3693.

"44. In case of retirement for infirmity, pensions have been granted in all the instances where service has exceeded 11 years, but these are only four in number. In 33 other instances

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instances small gratuities have been given by way of addition to the savings returned from the fund.

"45. The men appear to have been much dissatisfied, and not without reason, both at the slender amount of the pensions and gratuities when granted, and at the refusal of pensions in other cases, but so far as appears, the first remonstrance on the subject was addressed to the Board in 1873. Early in the following year, a formal scheme was submitted by the men for acceptance by the Board, and from that time onwards the matter in different forms engaged the attention of the Fire Brigade Committee, the Works and General Purposes Committee, and the Board itself. These deliberations, however, came to no definitive result after this Committee had been appointed. On the 31st March 1876, a scheme was approved by the Board; but the very next day, before it was formally issued, the men presented a memorial in which they unanimously rejected it. The matter was then allowed to drop for a time, but early in the present year another superannuation scheme, a copy of which will be found in the Appendix to this Report, was proposed by the Board and accepted by the men, and is now in operation. The grievance may therefore be taken to be at last disposed of. 4825.

"46. In the judgment of your Committee, it is matter for regret that this redress came so late. In justice to the Board, however, it must be borne in mind that the Board were not under any contract to provide superannuation (except to the widows of those killed in the service), and therefore that the men, in demanding superannuation, were in effect demanding for themselves an increase of pay; that the framing of a superannuation scheme, to be satisfactory both to the Board and to the various ranks of those employed, was a work which would, under any circumstances, have required much care and consideration; but in this case was peculiarly complicated on account of the necessity to make special provision for back service, the fire brigade having existed so long without a system of superannuation, and having been originally constituted of men transferred from two other services, neither of which was under the the Metropolitan Board. The Committee would further express their opinion that the men, being misled by the not sufficiently explicit language of the scheme of 1876, hastily rejected it, without understanding, or so much as asking for an explanation of its provisions, which at all events, in their retrospective operation, were liberal.

"47. As the result of the dissatisfaction felt by the men on these various grounds, Captain Shaw represented to your Committtee that the service had been rendered less popular than it would otherwise have been. In proof, he stated that he experienced difficulty in obtaining recruits, and had found it necessary to lower the standard; that whereas the age of admission was originally not to exceed 25, it had recently been relaxed to 30, and that even this period could not always be adhered to. Your Committee, however, consider that the difficulty of obtaining firemen is in part to be attributed to the rule of the brigade that none but sailors should be admitted, a rule which, according to the experience of the brigade at Manchester and Liverpool, and in the opinion of your Committee, it is not necessary to insist upon. 936. 918. 926. 6862.

"48. The results of the examination by your Committee into this part of the subject may be thus summed up: If the present system of fire extinction is to be continued, that is to say, if, as heretofore, fire engines are to be the only appliances employed, and if for the purpose of working those engines a separate force is to be maintained under the Metropolitan Board, your Committee, without adopting the exact figures named by Captain Shaw, are of opinion that, as pointed out by him, there are required more stations, more engines as well on the river as on land, more fire escapes, better telegraphic communication, and an increase of the force both for ordinary operations and for special emergencies; in short, a general extension of the establishment, involving a large additional expenditure.

"III.—POLICE.

"49. The Fire Brigade Act expressly authorised all police constables to aid the brigade in the execution of their duties, and gave them power to close streets, and to remove any persons interfering with the operations of the brigade. General orders have accordingly been issued on the subject, by the Commissioner of the Metropolitan Police, copy of which was laid before your Committee. From these, it appears that the first duty of a police constable, on the breaking out of a fire on his beat, is to give the alarm on the spot, and arouse the inmates and neighbours; next, he gives or sends (generally by means of a bystander) notice, not only to the nearest police station, but also to the nearest fire-escape station, to the nearest fire-brigade station, and to the turncocks, and the regulations expressly declare it to be the duty of each constable to be possessed, beforehand, of all the information that may be necessary for the purpose. If the police arrive before the brigade, it is their duty to exert themselves in every way for the rescue persons in danger, and the removal of property, conformably with the wishes of the proprietors; also to secure a clear space for the action of the fire brigade. But as soon as the firemen arrive, the police fall back on their normal duty of preserving order, which, when a large crowd has collected, becomes a matter of considerable difficulty. In case of a serious fire, notice is always sent at once to the assistant commissioner and district superintendent.

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3981. 2940. "50. It is satisfactory to your Committee to be able to report that the relations between the fire brigade and the police are of a cordial and harmonious character, each force, however, confining itself to the independent exercise of its proper functions.

Appendix, No. 9, p. 641. "51. In the course of the inquiry it was admitted on all hands that the metropolitan police might in several further respects be utilised as auxiliary to the fire brigade without involving any change of organisation in either force, any interruption of police duties or other inconvenience, and at a trifling expense. Many witnesses of practical experience, notably Captain Harris, the Assistant Commissioner of Police, went further, and recommended that the fire brigade should be incorporated with the police; but this latter proposition was not approved by others, especially by the Commissioners of Police for the metropolis and for the city.

"52. The case appears to stand thus: At present the duty of extinguishing fires is assigned exclusively to the fire brigade under the Metropolitan Board. Apart from any difficulty arising from water-supply, which will hereafter be considered, the two main defects inherent in the system appear to be—1. The interval that necessarily elapses before operations for the extinction of fire or preservation of life can begin, owing to the fact that neither the brigade, nor the turncock, nor the fire escapes are on the spot; and, 2. The lack of a reserve force in the brigade to meet any extraordinary conflagration or conflagrations. With respect to the first, it has been shown that the brigade stations are placed at considerable intervals; and it must be remembered that the distance between the site of the fire and the brigade station applied to has to be traversed twice, once by the messenger from the fire to the station, and a second time by the brigade from the station to the fire. The same remark applies with respect to the turncock and the fire escape. It is during this interval, at the commencement of the fire, that assistance is most efficacious. Every moment that passes greatly enhances the difficulty. As regards the question of reserve, your Committee have already adverted to the fact that, as the brigade is at present constituted, the total force available at night-time for active service in the extinction of fires is under 200 men. Now it is clear that neither of these defects admits of being completely remedied by the Metropolitan Board, except at a great expenditure on a corresponding addition to their establishment, both of stations and men, and that this expenditure is so far questionable in that the use of this addition to the establishment will be not constant but only occasional. On the other hand, the metropolitan police, a disciplined force of 10,000 men distributed over the metropolis, and constantly patrolling the streets, with stations and standpoints at short distances from each other, and complete telegraphic arrangements, seems admirably adapted to supplement in the most economical manner these two defects. Moreover, the police already exercise certain functions in connection with the brigade, and it cannot be doubted that unity of management and responsibility would produce increased efficiency.

Harris, 7777. Harris, 7854. "53. It will be convenient, however, to exhibit the proposal in further detail. The metropolitan police have 152 stations, of which 75 are within the jurisdiction of the Metropolitan Board, each station being connected by telegraph with the head-quarter station of the division. If this head-quarter station were connected by telegraph with the fire brigade station of the district, the result would be at once to add, within the area at present served by the brigade, 75 to the number of places from which notice of fire could be immediately communicated to the brigade. 7987. Again, each police station has more or less space attached to it where apparatus for the extinction of fire, such as manual engines, hose, axes, folding ladders, &c., might without inconvenience be kept, and where men would be available for immediate service, it being the custom for some 30 or 40 constables off duty to be present at each station. 7734. 7878. The only expense required would be the cost of additional fire appliances and telegraphic communication.

Harris, 7814. "54. Further, besides the police stations, there are in the Metropolitan Police District (and mostly within the jurisdiction of the Metropolitan Board) 280 fixed points at which a constable is stationed 16 hours out of the 24. It would only be necessary to appoint an additional constable at each fixed point during the remaining 8 hours, to connect each fixed point by telegraph with the fire brigade station, and to provide in a sort of sentry box at the point a small quantity of fire appliances of the same character as those proposed to be kept at the police station, and there would thus be gained more than 200 places from which the fire brigade could be summoned by telegraph, with an intimation of the exact locality of the fire, and as many places from which personal assistance could be rendered, assistance it may be of a single individual, but one on the spot, trained, equipped, and officially responsible.

"55. The result of this utilisation of police stations and fixed points would be, that in the same area as that now served by the brigade,—the metropolis proper,—there would be, instead of the 53 stations now existing, 328 places from which assistance, more or less, could be immediately procured for the extinction of fires, and in addition there would be constituted more than 150 such places in the parts of the metropolitan police district lying outside the metropolis. Looking to the supreme importance of moments at the early stages of a fire, the advantage of such co-operation from the police, even under the present conditions of water supply, can scarcely be overrated.

"56. The advantages of the police force as a reserve in case of an extraordinary conflagration, need no special explanation.

"57. Colonel

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" 57. Colonel Henderson is not in favour of an amalgamation of the fire brigade with the police, being apprehensive lest such additional duties thrown on the police with respect to the extinction of fire might interfere with the discharge of their duties as constables. Colonel Fraser points out, that so far as the City is concerned, the area is so small, and so well provided with fire stations, that the reasons in favour of amalgamation scarcely seem to apply.

" 58. Captain Harris, on the other hand, takes a different view. He sees no difficulty in the proposed amalgamation; indeed has long been of opinion that without such an amalgamation the metropolis can never be adequately protected against fire, and he has furnished the Committee with an elaborate plan by which he proposes such an arrangement should be effected. His opinion coincides with that of the late Commissioner of Police, Sir Richard Mayne, and with the recommendation of the Select Committee which originally suggested the establishment of a public fire brigade.

" 59. The objections taken to the employment of the police for the extinction of fires appear to your Committee not to be borne out either by the circumstances of the case or by experience; for where the system has been already tried, as at Liverpool, Manchester, and the Royal Dockyards, it has proved successful. The only difficulties that attend the proposal seem to arise from the fire brigade being already under the Metropolitan Board, and from the co-existence of two police forces in London, one for the City and another for the rest of the metropolis. Your Committee, however, consider that objections on these grounds ought not to prevail. The advantages of the police force, with its numbers, its stations, and organization, are such as no extension however great of the fire brigade establishment under the Metropolitan Board could properly secure, and they would be attained at much less cost to ratepayers; moreover it would thus be possible to extend the operations of the fire brigade to the whole of the metropolitan police district, the outer parts of which (the suburbs lying beyond the jurisdiction of the Metropolitan Board) are at present very imperfectly protected against danger from fire. Nor do your Committee see any reason why the Corporation should be more unwilling to admit into the City the fire brigade as a distinct branch of the metropolitan police than they have been to admit the present brigade when a separate force subject to the jurisdiction of the Metropolitan Board. The rest of the Metropolitan Police not belonging to the fire brigade, would not be empowered to act in within the City, except as hitherto on the express requisition of the City authorities.

" 60. Your Committee, therefore, have arrived at the conclusion that if such extension of the fire brigade as they have already pointed out to be necessary is to take place, it would be best accomplished, both in respect to economy and efficiency, by the brigade being constituted a branch of the Metropolitan Police; a distinct branch under the immediate directions of an assistant commissioner to be appointed for the purpose. The preliminary action of the constables and the special operations of the firemen would thus be brought into closer concert. The police stations and stand-points would be utilised for the purpose of the brigade, and the whole force of the police would be available as a reserve. These conclusions are irrespective of any change that might be adopted in the system of metropolitan water supply, or in the mode of using water for the extinction of fires; questions which your Committee will now proceed to consider.

" IV.—WATER SUPPLY.

" 61. London, and by this term is meant an area considerably larger than the Metropolis technically so called, is supplied with water by eight companies. These companies are commercial associations, from time to time established by private Acts of Parliament, primarily for the purpose of selling water for the daily consumption of the inhabitants within their districts.

" 62. They are controlled in common by certain general enactments, the Metropolis Water Acts of 1852 and 1871, and provisions in the Fire Brigade Act of 1865, also the Waterworks Clauses Act of 1847, which is expressly applied to them. But, subject to these general enactments, they are governed by their own special Acts, each company having an independent area, a separate system of pipes, and peculiar regulations suitable to its own circumstances. None of the companies are under any obligation to provide water sufficient for the extinction of fires; all that is required of them under the general enactments above mentioned is to allow the gratuitous use of their water for this purpose, and to grant certain special facilities, which will presently be noticed. But, except in these particulars, the companies throughout the Acts, whether public or private, are treated as mere purveyors of water for ordinary consumption, and are authorised in carrying on this business to consider solely the convenience of their customers, and the profit of their shareholders. The result is that whilst what is needed for the extinction of fires is an immediate and ample delivery of water, the three main conditions by which such a delivery is ensured, viz., constant supply, high pressure, and large pipes, and regulated with a view, not to the extinction of fires, but to the domestic and manufacturing requirements, which are far more easily satisfied.

See p. 664.

See 3833 B.

10 Vict. c. 17, s. 42.

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"63. The convenience of constant supply to ordinary consumers needs no explanation, but its value for the purposes of fire extinction is of yet greater moment. With a constant supply, a fireman, without waiting for a turncock, can obtain water immediately from any pipe, but under an intermittent system it is useless for him to have access to the pipe, unless it happens to be charged at the time; he must needs wait for the turncock to turn the water on to the point of delivery, and in the mean time the fire will advance possibly beyond control. The companies are under no statutory obligation to give a constant supply. They can be required to do so either by the Metropolitan Board, or by the Local Government Board. But no such requisition has been made on account of the cost that would be occasioned by the necessary alteration of the house fittings. As a fact, two only of the companies, the East London Company, and the Kent Waterworks Company, have for their own purposes established a constant supply, and that only in parts of their districts; and in addition to this, the mains (all the mains of some companies, and some of the mains of other companies) as distinct from the smaller service pipes which lead off the water from the mains to streets or groups of houses, and from the still smaller communication pipes which distribute the water to the individual customers, are constantly charged night and day. But as will presently appear, under the existing system of fire-plugs, water cannot be drawn direct from the mains.

34 & 35 Vict. c. 113, ss. 8. 11.

"64. So as to pressure. The amount of the pressure on the water in the pipes is a question of primary importance to the consumer as determining the level at which his cisterns, &c., can be supplied. But it also limits the means available for the extinction of fires, since it affects the rapidity, and, therefore, the volume of discharge, and also the height of a jet deliverable from the extremity of the pipes. It will be found, however, that the service level alone is enforced by the law. In order to attain the elevation from which pressure is derived, the whole of the water provided for the metropolis by each of the companies has to be pumped. In some cases the mains are filled direct from the pumps, in others by the intervention of a reservoir from which the water is allowed to gravitate, the advantage of the latter mode being that so long as there is water in the reservoir there will be a supply in the pipes, whereas in the former mode if the pumping is interrupted the supply at once fails. The degree of elevation or pressure is in each case regulated by the special Act. In the systems of two companies the statutory pressure is relative, being such as to ensure delivery at a certain height above the street level; in others, the pressure is fixed absolutely with reference to a datum; but in the latter case no less than in the former, the limit is determined solely with a view to meet the service for domestic supply. Accordingly the statutory limit is not strictly observed, the companies in their own interest frequently giving extra pressure where such is required, or reducing pressure where they can do so without inconveniencing their customers. For instance, the East London Water Company, who may be called on to give such pressure as will conduct the water 40 feet above the pavement, actually give less than that pressure in certain portions of their district; they also give less at certain hours, as at night, when less water is needed for manufacturing and domestic uses, although for the purpose of extinguishing fires water is far more likely to be required in the night than during the day.

4212 B.
4591 B.
4614 B.
3852 B.
3995 B.
4001 B.

"65. Similar observations apply to the size of the pipes, which is one of the main conditions that determine their delivering capability. Their dimensions are fixed solely with a view to the demands made on the companies by their consumers. There are in the metropolis, notably by the river side, many warehouses, which, from their requiring only a small quantity for daily use, are supplied through an extensive length of narrow pipes intermittently charged at low pressure, although from their extreme height, and from the vastness of their contents, at once precious and highly combustible, these same buildings more than others ought to be protected from fire by means of a high-pressure supply delivered through large pipes, either themselves constantly charged, or in close proximity with mains.

4396 B.

"66. Speaking generally, there are two modes of drawing water from the pipes for the extinction of fires, viz., plugs and hydrants. The subject of hydrants will be dealt with in a later part of the Report. For the present your Committee would confine their observations to fire-plugs, which alone, with few exceptions, are used in the metropolis.

"67. A plug, as its name denotes, is a stopper, usually made of wood, driven fast into a hole made for the purpose in a water-carrying pipe. The stopper is drawn when water is wanted, and replaced when enough has been obtained. Drawing the plug is a comparatively simple operation, which can be done by the fireman, if (as is generally, but not always, the case) he knows where the plug is placed. The fireman accordingly always carries with him tools for that purpose. The plug, however, cannot be replaced whilst the water is flowing, by reason of the pressure being too strong. The water has first to be turned off, and this can only be done by the turncock.

"68. Plugs are not used on mains, in the Metropolis at least, on account of the pressure; the plugs employed are on the service pipes. A plug, as above described, merely releases the water; and in order that the water may be used, a fire-engine, whether worked by hand or steam, is requisite, and has to be brought up to the spot. The water is either allowed to flow out on the ground and then dammed up into a pool, or is made to run into a portable cistern carried by the fireman for the purpose; from this pool or cistern the

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the engine feeds itself through its suckers, and by means of its power projects the water through a hose to the requisite height on the burning building. Occasionally a standpipe or dummy is forced into the plughole for convenience; but however the engine is supplied under the plug system, an immense quantity of water always runs to waste.

"69. The fixing of plugs on the pipes was originally assigned to the churchwardens of the several parishes as the local authority at that time charged with the duty of extinguishing fires. Subsequently, by the Waterworks Clauses Act, incorporated in the Special Acts of the company, the churchwardens were empowered to require the companies, at the expense of the parish, to fix fire-plugs at convenient intervals. Appendix, p. 664.

"70. By the Fire Brigade Act all these powers of local authorities as to fire-plugs were transferred to the Metropolitan Board, to whom they now belong. The same statute also expressly enacted that each water company should provide, at the expense of the Board, on any mains or pipes within the Metropolis, plugs for the supply of water in case of fire, at such places, of such dimensions, and in such form, as the Board might require. 28 & 29 Vict. c. 90, s. 32.

"71. The Acts authorise the firemen to act where they can without the intervention of the companies' turncocks. With this view the companies are bound to keep for inspection maps showing their pipeage and the spots where the screw-cocks are placed for regulating the service, and if required must give extracts or copies to the Metropolitan Board; they must also deposit keys of the fire-plugs at places prescribed by the Board, and the firemen belonging to the brigade may use these plugs as they may deem necessary for the purpose of extinguishing any fire, and may cause water to be shut off in order to procure a better supply or pressure at the point where delivery is required. To a great extent, however, these powers and provisions are unavailable, by reason of the intermittent character of the water supply, the absence of appliances for obtaining direct access to the mains, and the complexity of the pipeage system. Practically, the firemen are dependent on the turncock to turn on the water at the required point, to shut it off from other points for the purpose of obtaining a fuller delivery, and to shut it off altogether when the fire is extinguished, in order that the plug may be replaced. 15 & 16 Vict. c. 84, ss. 17 and 18, as amended by 34 & 35 Vict. c. 113, s. 49. 28 & 29 Vict. c. 90, s. 32. 28 & 29 Vict. c. 90, s. 12.

"72. Such then being the system of fire-plugs in use in the Metropolis, your Committee would point out that it is one which, however worked, must always be unsatisfactory. It is wasteful of water; and waste of water means a corresponding waste of power of delivery from the pipes. It cannot take advantage of the constant supply in mains (which, even under an intermittent system are often kept filled), because plugs cannot be used on mains. It cannot take advantage of any pressure that there may be on the water in excess of what is necessary to feed the engines, indeed any extra pressure only adds to the waste of water. But these drawbacks are insignificant by the side of the fundamental defect that the system does not admit of anything being done towards extinguishing a fire, until the firemen have arrived at the spot with the engine, and in most cases the turncock also. With the utmost promptitude the arrival of the firemen and the turncock cannot take place until after the lapse of a considerable number of minutes.

"73. This defect is of vital importance, is inherent in the system, and, beyond a certain point, plainly incurable.

"74. The matters then for consideration seem to be how far the evils of the system are mitigated by the efficient arrangements on the part of those concerned in working it, the Metropolitan Board and the water companies, and whether it is practicable to introduce a superior system as a substitute.

'75. With respect to the Metropolitan Board, the constitution of the brigade has been already described; it is sufficient here to repeat that a considerable addition to the number of men, stations, and engines is beyond question indispensable, if the force is to be rendered adequate to the working of the system in which it is engaged.

"76. With respect to the water companies, in past years complaints were made against them by the Metropolitan Board that the turncocks were often behindhand, and that the supply of water was insufficient. The companies had much to say in their defence; but, at all events, these complaints have of late abated. The companies appear to have taken pains to secure the prompt attendance of the turncock; and in general the turncock arrives before the firemen. In the year 1875 there were only four cases in which short supply of water was made the subject of a formal report by the brigade. And generally it seems to your Committee that the companies cannot be charged with any failure of duty.

"77. But this does not mean that, in the judgment of your Committee, the arrangements are satisfactory; on the contrary, there is abundant evidence of the prejudicial effects resulting from want of concert between the Metropolitan Board and the companies, and from the several companies being independent of each other, under no statutory obligation to co-operate in the extinction of fire, and, indeed, scarcely justified by their constitution in incurring expenditure for that purpose. Thus the turncock does not, as at Appendix, No. 9, p. 640.

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1086. Liverpool, live at the brigade station, and accompany the engine to the fire; there is no provision for communicating with him by telegraph, nor is it even recognised as the duty
1081, Shaw. of the brigade to see to his being summoned. There are no means of one company lending to another additional pressure, nor, except in certain cases, of any company bringing to bear in a lower zone the superior pressure it possesses in a higher zone; still less is
East London, 3539, 3553 B. Kent, 4219 B. Middlesex, 4481 B. there, as at Liverpool, telegraphic arrangement by which this superior pressure can be instantaneously applied. And though it may seldom happen that the supply is so short or so tardy as to disappoint expectations formed on the known limits to the capabilities of the companies, and therefore to constitute a legitimate ground of complaint, it is obvious that the engines of the fire brigade would be able more speedily to suppress fires, if the water supply were constant instead of intermittent, and if the pipes were larger and the pressure higher.

"78. To pass now to the consideration of the other alternative, hydrants.

"79. Hydrants vary much in their construction; but for present purposes a hydrant may be roughly described as an appliance permanently attached to the water-carrying pipe, so constructed as to give direct communication with the water by means of opening a stop-cock, and to admit of a hose being readily and securely screwed on. When water is wanted the hose is screwed on, and the stop-cock opened; the water then flows at once through the hose into the engine, if an engine is used, or as a jet if there is no engine. When enough water has been procured, the stop-cock is shut, and the hose unscrewed. There is no waste, and all the operations, the opening and shutting of the cocks, the screwing and unscrewing of the hose, are of the simplest character.

"80. Even as a feeder to an engine, a hydrant is superior to a plug, alike whether the supply is constant or intermittent. It avoids all waste of water, securing to the full whatever quantity the pipe is able to deliver. It can be attached as safely to a main as to a service pipe, and, as already stated, the mains are in many cases, kept constantly charged, and of course deliver a much larger quantity of water. Several instances have been brought to the notice of your Committee, where fires have been ineffectually dealt with, from the engines having to wait for a supply in the service pipes, or from such supply proving insufficient, whilst close at hand was the main with abundance of water,
4046 B. 4049 B. 4061. 4063. 4065 B. which could have been immediately available if only there had been a hydrant. What, however, especially distinguishes a hydrant from a plug is that, without the intervention of an engine, it can itself be used as an engine for the purpose of throwing a jet. The water of the pipes, when liberated from the opening of the stop-cock, discharges itself at the end of the hose in a jet, which is capable of being directed by means of the hose towards any given point. The elevation and volume of this jet, and consequently its utility, vary according to pressure and other circumstances.

"81. As already stated, the earlier Acts contemplated fire-plugs as the means to be used in the Metropolis for the purpose of drawing water from the pipes for the extinction of fires. Hydrants were first recognised by the Water Act of 1871, which in this respect effected two important changes.

34 & 35 Vict. c. 113, s. 34. "82. In the first place, it declared that in that Act, and also in the Fire Brigade Act of 1865, the term fire-plug, and the term "plug" should include hydrants, and all other apparatus necessary or proper in connection with the companies' pipes for the supply of water in case of fire. Consequently it gave power to the Metropolitan Board, at any time and place, whether there was a constant supply or not, if they should think fit to incur the expense, to cause hydrants instead of pluge to be placed on any mains or pipes, the work to be done by the company, but paid for by the Board.

"83. The second change effected by the Act was limited to the case where a company furnishes a constant water supply. In that case the company was empowered by notice to call on the Board within two months to exercise their power of specifying to the company what plugs or hydrants were to be put up in any part of the companies' water limits having a constant supply; and if the Board failed to make this specification within two months, power was given to the company, if they thought fit, to provide in and for that part of their water limits such plugs or hydrants for supply of water in case of fire at such places, of such dimensions and in such form as to the company might seem necessary or proper, the cost of providing all such plugs and hydrants to be at the expense of the Board.

"84. The complaint of the water companies is, that these enactment have been frustrated by the persistent refusal of the Metropolitan Board to take advantage of them. The mains throughout the Metropolis are, in many cases, kept constantly charged; and two of the companies, the East London Waterworks Company and the Kent Waterworks Company, are, by degrees, extending constant supply over their service systems; but notwithstanding this, and in spite of frequent representations, the Board have declined to adopt the hydrant system. In only one instance have they voluntarily set up hydrants, viz., in the new street recently constructed under the name of Northumberland Avenue.
4114 B. In two other instances action has been forced upon them. The Kent Waterworks Company, on extending the constant supply to Rotherhithe and Deptford, gave formal notice to the Board, in pursuance of the Act of 1871, and thereupon the Board erected certain hydrants. More recently the same company gave a similar notice respecting the Plumstead

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stead District, and on the Board abstaining from taking action during the prescribed period, put up 60 hydrants, the cost of which, in accordance with the Act, has been defrayed by the Board. Similar applications have been made by the East London Waterworks Company, but have been disregarded by the Board.

"85. The companies contend that there is nothing to prevent hydrants being successfully used as substitutes for engines, or as auxiliaries to them, at all events wherever constant supply is given; that fire-plugs are an antiquated and inferior device for procuring water for fire extinction, and that their continued use is contrary to the interest of the metropolitan ratepayers, whose property it is the duty of the Board to protect by the most efficacious means. The companies also feel specially aggrieved at the adherence to a system which wastes their water unnecessarily, diminishes the available pressure, and exposes them to the charge of not providing sufficiency of water at places where an ample supply might be immediately drawn by means of hydrants placed on the constantly-charged mains.

"86. The Board, without questioning the superiority of hydrants, where the conditions are favourable to their employment, deny that these conditions are to be found under the present constitution of the metropolitan water supply. They consider that under existing circumstances hydrants would be but a doubtful advantage; at all events, not one equivalent to the enormous cost which would be entailed by a change from one system to another.

"87. The questions, therefore, that presents themselves are these:—What are the conditions necessary for the effective employment of hydrants; to what extent are these conditions satisfied under the existing system of metropolitan water supply; and what would be the cost of providing hydrants? It will be more convenient to consider the last question first.

"88. The cost of adopting a system of hydrants depends on the cost of each hydrant and the number of hydrants required. With respect to the cost of providing and fitting a hydrant, a variety of circumstances have to be taken into consideration. Much would turn on the character of the hydrant itself, according as it is simple or elaborate in construction; much on whether any extra work, as the construction of a small branch to receive the hydrant, is required; much on whether the hydrant is to be affixed to a pipe already laid down, a process entailing not only extra work on the pipe, but the necessity of breaking up the road and making it good again, and the expense of this latter operation itself varies according as the material of the road is earth, pavement, wood, or asphalte, and as the road is a crowded thoroughfare, or otherwise, for in a crowded street special precautions and night-work at extra pay are indispensable. How wide is the range of cost may be estimated from the fact that the simplest hydrant, as used at Manchester, by itself can be procured for the sum of 1 *l.* 10 *s.* 8 *d.*, whereas the expense of providing, fitting each hydrant, and doing the necessary work in connection with it in the City of London, will probably amount from 25 *l.* to 30 *l.* In the case of the Metropolis, the additional cost resulting from the hydrants having to be affixed to pipes already laid down would be unavoidable, and in some streets the special difficulties would be as great as in the City. On the other hand, there are many parts of the Metropolis in which the work would be of an inexpensive character. 7379. 506 B.

"89. With respect to the number of hydrants required, it is difficult to form any trustworthy estimate from the length of the actual pipeage in the Metropolis, or from comparisons of the area and population of the Metropolis with those of provincial towns where hydrants have been adopted. It is certain, however, that throughout the parts covered with continuous buildings, as distinguished from the comparatively rural portions, hydrants must be placed at short distances from each other, since every additional length of hose attached to a hydrant greatly weakens its powers of discharge; and to ensure success it is necessary that there should be the means of bringing several hydrants to bear on the fire at once. The number, therefore, of hydrants required for the entire Metropolis could not fail to be very large. The gross cost was estimated by different witnesses at sums varying from a quarter of a million to a million, but this sum would of course be greatly reduced if for the present hydrants were to be placed only on such mains and service-pipes as now receive a constant supply. 5866, 5867.

"90. Next as to the conditions necessary for the effective employment of hydrants. This question your Committee propose in the first instance to consider as it was presented by the witnesses on behalf of the Metropolitan Board, who directed their evidence to the availability of hydrants, not as feeders to fire-engines, or as appliances to be used before the arrival of the engines, but as a complete substitute for them. The first condition which was specified as necessary for this purpose was that of constant supply. Not that constant supply has any bearing on the force of the hydrant, an intermittent supply, when once water is obtained, being equally effectual in this respect. Under the intermittent system water cannot be obtained without the help of a turncock; and the interval of time requisite to enable a turncock to arrive is sufficient to enable a fire-engine to arrive also; and a fire-engine, once on the spot, leaves nothing for the hydrant to do, except to feed the engine.

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"91. Next it was urged hydrants must be able to throw a jet sufficient in height and volume to reach and extinguish any fire with which they may have to deal. The necessary height will be the height of the tops of the houses and buildings in the street, and would vary, therefore, from 50 to 80 or 90 feet, or even more, above the level of the pavement. The volume which Captain Shaw declares to be necessary in the case of a large fire, is a discharge at the rate of 2,000 gallons per minute, to be distributed through 12 or 14 engines or hydrants. This may be taken as the maximum. Now, the height and volume of a jet are regulated by certain hydraulic laws which cannot be adequately expounded except in a scientific treatise, and are very difficult even for experts to apply to the varying and complex circumstances of each case.

"92. The general result, however, of the evidence given on behalf of the Board was that the conditions to be realised before a system of hydrants can be relied upon as a substitute for fire-engines are, constant supply, high pressure concentrated on the point of delivery, pipes sufficient in diameter and traversing a moderate distance, and hydrants disposed at narrow intervals so as to be available without an excesssve length of hose.

"93. These conditions are admitted to be realised with marked success in some provincial towns which possess special local advantages in respect of water supply, and which have had their pipeage laid down with a view to the use of water not only for consumption, but for the extinction of fires. Such is the case at Liverpool, Manchester, and Brighton, where the waterworks are in the hands of the corporation, and arrangements exist for immediately bringing to bear the highest available pressure, and the police are employed in working the hydrants. Engines are not discontinued, but they are reduced in number, and used chiefly by way of reserve. In Manchester it appears that in only 3 per cent. of the fires is it found necessary to call in the engines.

Liverpool, 7474, 7475. 7573. 7689. Manchester, 7362, 7363. 7389. 7394. 7396. Brighton, 6023. 6026. 6030. 7399.

"94. The conditions are also realised beyond question in parts of the Metropolis. In the City of London, where the supply from the New River Company is intermittent, but the mains are constantly charged, the Corporation have already erected some hydrants, and are about to adopt the system more extensively. Their first commencement was in the Holborn Valley District; when carrying out in that district the recent Improvement Act, which compelled them to lay down new pipes, they took the opportunity of supplying the new mains with hydrants, and Captain Shaw appears to be satisfied with their efficacy. At the present time the Corporation are engaged in establishing hydrants at their own expense in one of the six police districts of the City, and from experiments made they have good reason to believe that these hydrants will give a jet which will be thoroughly serviceable in respect of both height and volume; and if the result proves successful hydrants will doubtless be extended to the whole of the City. With respect to the work now in hand, the arrangement is that the hydrant shall be placed either on the main itself or (in the case of streets which are without a main) on a branch which the Corporation lays down for the purpose. The cost of making and laying of each branch is about 16 *l.*, and the cost of each hydrant of the form which has been provisionally adopted is 6 *l.* 16 *s.* 3 *d.*; so that the total cost of providing and laying down such a hydrant will probably amount to from 25 *l.* to 30 *l.* The pressure given by the New River Company is greater than that of any other company, and is about to be enlarged by the addition of 50 feet head available in two-thirds of the City. The mains are large, and the branches having been constructed expressly with a view to the use of hydrants, are of sufficiently large dimensions, and of not excessive length; indeed, the area of the entire City is only one square mile. The cost of laying down the hydrants is comparatively much higher than would be requisite elsewhere, whilst the value of property in the City warrants an exceptionally large expenditure.

760 B. 770 B. 476 B. 486 B. 779 B. 791 B. 904 B. 821. 775 B. 864 B. 506 B. 811 B. 829 B.

"95. In the Temple, which is likewise supplied by the New River Company, the Inns of Court have lately caused hydrants to be established, but as a preliminary step they deemed it necessary to construct a new 7-inch main to connect with the 12-inch main in Fleet-street and the 7-inch main in Whitefriars, and attached to the main in the Temple branches to which the hydrants are fixed. The hydrants themselves, and their fixing, cost on an average 4 *l.* 3 *s.* 3 *d.* a-piece, and from the experiments made it is the belief that they can throw a jet sufficient both in height and volume.

672 B. 677, 678, B. 680 B. 703 B.

"96. In parts of the district belonging to the Kent Waterworks Company hydrants have been laid down systematically. The earliest were those at Greenwich and Woolwich, erected before the transfer of the brigade to the Metropolitan Board, and at the request and cost of the local authorities. Greenwich Hospital, Woolwich Dockyard, and Deptford Victualling Yard are all efficiently hydranted, a suitable main having been laid down for the purpose. Further, as already stated, 30 hydrants have been erected in Rotherhithe and Deptford as the constant supply system was extended to these districts. Of these the first 11 were of different kinds and prices, selected with a view to experiment; the remaining 19 cost 4 *l.* 15 *s.* a-piece; these were tried in the presence of Captain Shaw, and the results pronounced satisfactory; and more recently Plumstead district has been hydranted by the same company, at the expense of the Board, each hydrant costing (without a stand-post), on the average, 3 *l.* 6 *s.* 11 *d.*

4029 B. 4233. 4230. 4241. 4247 B. 4114 B. 4155 B. 4179. 4182 B.

"97. Nor is there reason to doubt that there are many other districts in the Metropolis where hydrants could be used as engines if affixed to mains, or even to service-pipes. Your

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Your Committee, however, are of opinion that this cannot be taken to be the case with the Metropolis at large. The service-pipes are often so small in diameter that the utmost pressure within the range of possibility would fail to give a jet at all corresponding to that of an engine. In other cases the pipes may be large enough ; but the existing pressure, though adequate for the purpose for which it is designed, would be insufficient for the purposes of a jet.

" 98. The proposition, therefore, of the Metropolitan Board that, taking the Metropolis as a whole, hydrants, under the present conditions of water supply, cannot do all that is required of fire-engines, is one which is to be accepted. To argue, however, from this that no hydrants should be used, but only fire-engines, seems to your Committee to mistake the problem to be solved. The object is not how to deal with fires at their height, but how to quench them at the outset. For the former, engines will always remain necessary ; but for the latter they are not available. The engine is at a distance, has to be sent for, and to come ; with the utmost expedition it cannot be brought to bear until after the lapse of many minutes. In the meantime valuable property is being burnt, and what was a small fire has become a large one, perhaps a conflagration. A hydrant, on the other hand, is on the spot, and ready for instant service. That it is not so strong as a fire-engine is not a fatal objection ; in most cases not an objection at all. The volume which it can discharge may be small, but if promptly used will suffice to extinguish the fire, or to keep it down until the arrival of the engines. So, again, the jet may fall far short of the roof of a house ; but the fire is not always at the roof. If the hydrant can throw a jet on the third, second, or first floor, it may do all that is required ; and by mounting a ladder or fire-escape with a hose, the person in charge of the hydrant may be able to deliver water through the window at a place unattainable by a jet from the ground. But even as a a mere carrier of water to the door of the house the hydrant renders most important service, as by this means hand-pumps can be at once set to work. The efficacy 6775.
of hand-pumps so used is fully proved by the experience gained at Manchester, where 72 out of 308 fires were extinguished by hand-pumps. In short, the advocates of the hydrant can appeal to what has been well called the axiom of fire extinction, that small means, promptly exerted, are more efficacious than more powerful appliances at a later stage ; such axiom depending on the obvious fact that every fire begins by being a small one, and can then be easily dealt with, whereas if unchecked it rapidly gains head, and before long becomes uncontrollable.

" 99. But an essential condition to the utilization of hydrants is, that there should also be on the spot persons ready and competent to work them. If left to be worked by the firemen arriving with the engine, they would usually be superfluous, except as feeders to the engine. But this condition would be perfectly satisfied by police constables being appointed to the duty, and such an arrangement would naturally form part, and indeed constitute the chief value of the recommendation we have already made for the incorporation of the fire brigade with the police. Provided, therefore, that recommendation be accepted, your Committee are prepared to advise that throughout the Metropolis hydrants should be placed on mains and service-pipes wherever a constant supply is given.

" 100. The outlay requisite for this purpose would undoubtedly be large, but in the opinion of your Committee, would be remunerative to the ratepayers.

" 101. But whilst recommending that the hydrant system should be introduced without delay, and extended to the utmost practical limits, your Committee have to observe that it is impossible for the hydrant system (or, indeed, the fire-engine system) to be worked to the full advantage unless important improvements are effected in the metropolitan water supply ; and the question at once arises, how far such improvements can be required from, or carried out by, the several water companies as at present established. The improvements to which we refer are, the introduction of constant supply, increase of pressure, and enlargement of pipage.

" With regard to the first of these, it is doubtless within the competence of each company to give a constant supply ; but it is not to be expected that the companies generally will volunteer to do so, seeing that after this lapse of time six out of the eight companies still adhere to the intermittent system, and the other two have introduced this change only in parts of their districts. Nor is it likely that either the Metropolitan Board or the Local Government Board will exercise the powers they possess, under the Act of 1871, to make requisition on the companies.

" 102. With respect to pressure and pipage, it may be taken that the companies already acquit themselves of their statutory duties, the pressure given and the pipes used being now sufficient for the domestic supply, to which alone the obligation extends. But to make the system of each of the water companies self-sufficient, so that hydrants wherever placed will give a jet of the repuisite volume, would require a very large outlay ; new reservoirs would have to be constructed, or additional pumping power provided for engines, small or thin pipes would have to be replaced by large and strong ones, and house fittings would have to be strengthened. Your Committee are of opinion that the companies cannot be called upon to undertake this expense for the purpose of fire extinction, an expense from which they would derive no profit. No doubt want of pressure, and even of sufficient pipage, could, to a certain degree, be met by combinaiton between

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the different companies; but even this would involve fresh litigation, expense in establishing the necessary connections and in strengthening the pipage to receive the increased pressure, and, above all, such constant concert in working the arrangements as to pumping, use of the water, &c., as could scarcely be maintained between different companies having conflicting interests.

"103. Your Committee are thus brought to the conclusion that the water supply cannot be made to afford the full measure of protection which the Metropolis should possess against fire until it is consolidated in the hands of a single authority, conducting the business, not for immediate profit, but for public convenience, and placed under a statutory obligation to provide jets of water sufficient for fire extinction, as well as a supply for domestic consumption. Your Committee, however, feel that they would be exceeding the bounds of this inquiry if they expressed any opinion as to the conditions on which such transfer from the companies could best be effected, or as to the question what should be the new water authority; or as to the numerous other points of importance which are necessarily involved in a proposal for so complete a reorganization of the water system of the Metropolis.

"104. But they deem it necessary to observe that whilst the general result of such a concentration of management as they have indicated would be to secure an effective means of extinguishing fires, and thereby diminish the losses of the Metropolis, the several changes above mentioned in the system of water supply, which, when attempted by companies acting singly, are practically unattainable, would, if unity of control and consolidation of public interests were once established, be capable of being carried out with much less difficulty and expense.

"INSURANCE COMPANIES.

"105. As already stated, on the passing of the Fire Brigade Act, the insurance companies transferred their stations and plant to the Metropolitan Board. This is their only contribution towards the capital outlay on the brigade, the ratepayers having found all the rest of the capital, now amounting to 190,000 *l.* But towards the income of the brigade the companies have from the first annually contributed at the rate of 35 *l.* in every million assured; and from the increase of insurance business the yield of this contribution has swelled from 11,059 *l.* in 1866 to 18,093 *l.* in 1875, and now is more than one-third of the contribution from the rates. Some of the witnesses on behalf of the Metropolitan Board, who were examined before your Committee, represented that if it were deemed necessary to make a large addition to the stations, plant, and numerical strength of the force, and for this purpose to borrow further capital on the rates, and remove the limit of ½ *d.* on the rate annually imposed on the ratepayers, the rate of contribution from the insurance companies should be increased also.

"106. The insurance companies, it was represented to your Committee, do not ask to be relieved of their present contribution, being willing to acquiesce in the *status quo* as a compromise of long standing; but if it is proposed to augment their burden, they claim that the whole matter should be reconsidered on principle.

"107. Your Committee have come to the conclusion that no sufficient cause has been shown for augmenting the rate of contribution from the insurance companies; but they think that on the same principle as that carried out in the local Acts relating to Liverpool, Manchester, and some other provincial towns, a charge should be imposed on owners of uninsured property which has been saved from fire.

"VI.—THEATRES.

"108. In pursuance of the instruction that your Committee should have power to take evidence, and report with special reference to better means of preventing loss of life and property from fire in theatres, and other places of public amusement,—Your Committee have received evidence from the Lord Chamberlain, the permanent Secretary of his department, Mr. Ponsonby Fane, and the architect officially consulted by that department; from Mr. Pownall, a member of the Middlesex Bench, who are a licensing authority for music halls; from the Superintending Architect of the Metropolitan Board of Works, who administer the Metropolitan Building Act; from Captain Shaw, as representing the Fire Brigade; from Mr. Edwin Chadwick, on behalf of the Society of Arts, and from Mr. Penrose and Mr. Phipps, who, as architects, were qualified to speak with professional experience; from the proprietors or lessees of the Court, Criterion, Folly, East London, Pavilion, and Gaiety Theatres; from the proprietor of the Canterbury Music Hall; from the architect in charge of Exeter Hall, and from Mr. Mitchell, one of the committee of management of the Sacred Harmonic Society, who give their concerts in that building.

"109. They have also consulted the Report af the Select Committee of the House of Commons which inquired into the subject of theatres in the year 1866, and they have had laid before them the Report of a Special Committee of the Society of Arts on insecurity from fires and panics at theatres and places of public resort, which, amongst other valuable matter, contains the legal regulations enforced in theatres in Paris. Your Committee have further had the advantage of considering the recommendations made by the Brooklyn Committee after the great fire in that theatre in New York.

"100. All

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"100. All theatres, with the exception of two patent theatres, Drury-lane and Covent Garden, are annually licensed under the Theatres Act. The Lord Chamberlain's sanction is required before a play can be performed in any theatre, wherever situated; but his licensing jurisdiction is limited to such theatres as are within the boundaries of the metropolitan boroughs as they existed at the passing of the Theatres Act, or are in Windsor or Brighton, or any place where the Sovereign occasionally resides, during the term of such residence. 6 & 7 Vict. c. 68.

"111. Theatres in other parts of the Metropolis (as the Court Theatre, at Chelsea), and in the provinces, are licensed by justices in Special Sessions of the Division. 1776 B. 1852 B.

"112. The Act is silent as to the construction of theatres. The Lord Chamberlain has no power to make rules for any purpose, but in case of riot or misbehaviour he may suspend the license of any licensed theatre, or cause a patent theatre to be temporarily closed. The justices have power to make rules, and the Secretary of State may rescind or alter them; but these rules are only for insuring order and decency, and regulating the times when the theatre may be opened. In case of either riot or breach of the rules, the justices may, by a summary order, close the theatre. No power is expressly given to impose penalties; but the Act provides that penalties for breach of the rules may be recovered either by action or summary prosecution before justices, and requires the manager to be bound in a penal sum not exceeding 500 *l.*, and two sureties for a sum not exceeding 100 *l.*, for securing the payment of such penalties. This last requirement apparently extends to the case of a license from the Lord Chamberlain; but this is to be explained by the fact that the Bill when brought in contained a power (which was afterwards struck out in Committee) enabling the Lord Chamberlain to make rules for regulating the times when the theatres under his jurisdiction might be opened. Section 8. Section 9. Section 12. Section 7.

"113. Neither the Lord Chamberlain nor the justices, therefore, have any means of controlling the construction of a theatre, or other arrangements for protection against fire, except by exercising their power to refuse the grant or renewal of a license, and this course is practically inapplicable, as the result would be not only to inflict an excessive punishment on the proprietor, but to throw out of employment a large number of persons dependent on the theatre, and greatly to inconvenience the public.

"114. The number of theatres licensed by the Lord Chamberlain has grown from 25 in the year 1866 to 38 in 1877. Appendix, No. 3* B.

"115. The practice in the Lord Chamberlain's office, before granting a license, is to require the plans to be approved by an architect named by the Lord Chamberlain and the building to be constructed in accordance with the plan so approved. In the case of old theatres, suggestions are made from time to time, and when they undergo extensive alterations, the opportunity is taken to require improvements with a view to safety. Regulations, so called, for the conduct of the theatre, including proper provisions to be taken against fire, have always been issued, but only lately in print. Once a year, before the license is renewed, on a day of which notice is given beforehand, the theatre is thoroughly inspected by Mr. Ponsonby Fane and an architect, in order to ascertain whether the regulations have been complied with; but beyond this, there is no inspection except under special circumstances, the Lord Chamberlain's office (the expense of which is defrayed from the Civil List) not having attached to it any staff available for the purpose. 1275 B. Appendix 2 B. 1093 B. 2011. 2039. 1044 B.

"116. The theatres licensed by justices in the parts of the Metropolis outside the jurisdiction of the Lord Chamberlain are six in number, if the theatres at the Crystal Palace, Alexandra Palace, and North Woolwich, which are in the management of London Companies, are taken into account. In the case of the Court Theatre at Chelsea, it would appear that the Chelsea justices made no requirement as to its construction previous to granting the original license, nor caused any inspection subsequently to be made until recently, when after the disastrous fire at Brooklyn Theatre had called attention to the subject, the Chairman of the Chelsea Bench, and the surveyor of the district, inspected the Court Theatre, and made certain requisitions with a view to increased safety, which the proprietor has complied with. The proprietor is also furnished with a copy of the Lord Chamberlain's regulations, which are taken to have been adopted by the magistrates. 2505 B. Appendix 4 B. 1901—1903. 1928, 1929.

"117. Music halls, by which are meant places used for public music and dancing, or music alone, are not required to be licensed, unless within the City of London or Westminster, or a circuit of twenty miles, those being the limits of what is known as the Music and Dancing Act, 25 Geo. 2, c. 36, which is aimed at the suppression of disorderly houses in the Metropolis. The licensing authority under the Act are the County Quarter Sessions.

"118. Music halls are distinguished from theatres, by the rule that no stage plays may be performed in them. They vary much in size, an ordinary public-house being equally qualified to be licensed with Exeter Hall or Canterbury Hall, which are capable of containing several thousand persons. For the smaller halls special regulations for the prevention of fire would be unnecessary and oppressive; but in the case of the larger halls were the public are accustomed to congregate in great numbers, precautions are requi-

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site almost as much as in theatres; the risk of fire from without is the same, and if a fire were to break out, or a panic to arise, the disastrous consequences to the public assembled would be equally great. The chief difference is that theatres are more exposed to the risk of fire from within by reason of the shifting of the scenery and lights, and the storage of stage properties and other inflammable goods in the various rooms of the building; and also have more complicated arrangements for the accommodation of the public.

"119. If the proprietor of a music hall desires to sell spirits or other liquors, he has further to obtain a license from the Brewster Sessions of the Division, a matter that has a bearing on the present inquiry, because whilst numerous means of egress are serviceable in case of fire, the licensing justices under the Intoxicating Liquor Acts object, in the interests of order, to allow a multiplication of entrances and exits in what are practically public-houses on a large scale.

1845 B. "120. The licensing authority under the Music and Dancing Act have no power to affix any conditions to a license or to make regulations; the only option is to refuse the grant of a license or the renewal of a license, as the case may be. In practice, the safety of the building, or the precautionary arrangements against fire, are not among the matters 1822, 1823. 1826. considered by the justices; but usually, before granting a license in the first instance, the 2555. justices, or some of them, make a personal inspection of the premises, and if the building is intended to be licensed for the sale of liquor, the proprietor, before the building is erected, can only obtain a provisional license, under the Intoxicating Liquors Acts, by submitting a plan of the building to the justices exercising licensing jurisdiction under those Acts, and obtaining their approval.

"121. From the evidence of Mr. Hollingshead the number of music halls in the Metropolis would appear to be:—

Appendix 4 B.

Concert and Music Halls - - - - - - - -	37
Casino (The Argyll Rooms) - - - - - - - -	1
Public-Houses - - - - - - - - - -	20
Local Halls - - - - - - - - - -	10
	68

18 & 19 Vict. c. 122, 3106. 3107. 3053. "122. The Metropolitan Buildings Act is administered by the Metropolitan Board through district surveyors, the Metropolis (which includes the City) being divided into 62 districts and a surveyor being assigned to each. The surveyors are appointed by the
18 & 19 Vict. c. 122, ss. 33. 49. Board from candidates certified as competent by the Institute of British Architects after examination, and are paid by fees. Before a new building is commenced, or an existing building altered, notice has to be given to the district surveyor, whose duty it then
Section 39. becomes to enforce the observance of the provisions of the Act, as to frontage, height, and a number of other particulars. To these general provisions theatres and music halls are subject like other buildings; but in addition they are subject to the special provisions
Section 3. applicable to 'public buildings,' which are defined to mean 'every building used as a church, chapel, or other place of public worship; also every building used for the purposes of public instruction; also every building used as a college, public hall, hospital, theatre, public concert-room, public ball-room, public lecture-room, public exhibition-
Section 22. room, or for any other public purpose.' These special provisions require that the floors of the lobbies, corridors, passages, and landings, and also the flights of stairs, shall be of stone or other fire-proof material, and carried by supports of a fire-proof material, and
Section 30. further that every public building, including the walls, roofs, floors, galleries, and staircases, shall be constructed in such manner as may be approved by the district surveyor, or in the event of disagreement, may be determined by the Metropolitan Board. Thus, unless dispute arises between the surveyor and the parties, the matter never comes before the Board at all, and with so many surveyors, however competent, wide differences of opinion are inevitable. This has been especially the case as to the question of what is fire-proof material; but in general it may be said that there is no uniformity of practice.

1161 B. "123. The actual condition of theatres with respect to protection against fire necessarily varies in the different cases. The more modern theatres are less open to objection, whilst the situation and construction of the older ones leave much to be desired; but, with
1256 B. perhaps, one exception, every theatre has a separate exit for the box audience, the pit audience, and the gallery audience. Most of the theatres, but not all, are provided with hydrants, in some cases there is no main in the immediate proximity. In some theatres firemen are kept on duty in the building, but for the most part, to make use of an expression quoted by Mr. Ponsonby Fane, the best extinguisher of fire is found to be the carpenter's cap. The rate of insurance varies according to the circumstances, but in all it is very high, much higher than would be necessary if the provisions against fire were per-
729. 2373. 2482, 1532. 2575 B. fected. The regulations of the Lord Chamberlain, on the whole, are fairly carried out, but not so thoroughly as would be the case were the theatres constantly inspected, and a
1083 B. breach of the regulations followed by punishment. It is, however, satisfactory to record
1273 B. that during the last 50 years there has not been a single case in which the life of one of the audience has been lost from a fire in a metropolitan theatre.

"124. The

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"124. The condition of music halls, especially the older halls, not having been so carefully watched over, appears to your Committee urgently to require improvement.

"125. In considering what amendments in the law are necessary, your Committee do not propose to discuss the expediency of any alteration in the licensing authority of either theatres or music halls, as this would open up questions of considerable difficulty which are beyond the range of the present inquiry; nor is such alteration indispensable to insure the improvements they would suggest.

"126. The safety of the public from the danger of fire or panic in a theatre or other place of amusement seems to depend on two main sets of conditions, (1) those relating to the building, its position, structure, and arrangements of a permanent character, and (2) those relating to its daily management.

"127. The Lord Chamberlain pressed on your Committee that the licensing authority should be relieved of the duty of considering the first set of conditions, and that this duty should be assigned to some other competent authority, who should certify that the building was qualified, in respect of safety, to be used for the purpose for which the license was sought, and that on this certificate the licensing authority should, if they thought fit, grant the license; and the proprietors of theatres who were examined before your Committee all concurred that some such certification was highly desirable. 1079 B.

"128. Your Committee agree that the examination into the safety of the building is a function which should not rest with the Lord Chamberlain or justices, neither of them possessing the requisite staff, and there being objections to the creation of a staff for the purpose of performing duties which would be only occasional. The Metropolitan Board naturally suggests itself as the appropriate authority, being accustomed to the administration of the Metropolitan Building Acts, and already commanding the services of a large staff of competent architects. The Lord Chamberlain inclined to prefer a Government department, which would certify theatres much as the Board of Trade, through their inspectors, sanction the opening of railways for traffic.

"129. Your Committee, however, are unable to adopt this proposition, which, in their opinion, would be attended with difficulties. The Government could not undertake this charge for the metropolis alone without being pressed to do the same for the rest of the kingdom, which is out of the question. Theatres and music halls could not, without extreme inconvenience, be withdrawn from the general provisions of the Metropolitan Building Act. Nor do your Committee apprehend that if the Metropolitan Board were appointed the certifying authority, there would be any risk of collision with the Lord Chamberlain or the justices. The functions of the licensing authority would remain just as distinct as they are now, when the Metropolitan Boards is charged with the duty of enforcing the provisions of the Building Act with respect to theatres and music halls, as well as other public buildings. Your Committee are therefore prepared to recommend that the duty of certifying a theatre or music hall as safe should be assigned to the Metropolitan Board, but that this duty should be discharged directly by the Board, acting on their own responsibility, after receiving such professional advice from their architects as they may think expedient, and not be left to the district surveyor, subject only, in case of dispute, to an appeal to the Board. Indeed, your Committee consider that this change should also extend to the administration by the Board of the provisions of the Building Act in relation to public buildings other than theatres or music halls. In order to prevent the hardship which would arise if the applicant first went to the expense of erecting a duly certified building, and then was refused a license by the Lord Chamberlain or justices, it would be expedient to adopt a system (resembling that now sanctioned by the Legislature for the licensing of public-houses) of provisional licenses; that is, licenses granted by the Lord Chamberlain or justices, as the case may be, upon an examination of the plans before the building is begun, but not operating until confirmed, and confirmed, as a matter of course, on the production of certificate from the Metropolitan Board that the buildings have been properly constructed, and are duly qualified.

"130. The structural conditions and arrangements requisite to meet the danger of fire or panic are mainly regulated by practical considerations, and could only be settled by experts. As a safeguard against fire from without, the building should be isolated, either by an intervening space, or by a wall of proper strength and material. With regard to the interior, in addition to the necessity of substantial fire-proof construction, four points appear especially to require attention: (1.) Sub-division of risk, by separating from each other the various parts of the buildings, rooms, and passages by fire-proof partitions. (2.) Distribution of rooms, with a view to minimise the chance of a fire breaking out; for instance, no room should be constructed above the stage, nor should the carpenter's shop be allowed to be placed above the lights of the gallery. (3.) Facility of egress. The outlets should be numerous and separate; passages should widen outwards, and be large enough to contain a considerable proportion of the whole audience. In these passages no steps should be allowed, or other impediments likely, in case of pressure, to throw down persons or injure them. At the same time arrangements should be made to break the pressure by the interposition of barriers at intervals, or giving an angular direction to the passage: all doors should open outwards. (4.) Hydrants in connection with the mains, and provided with hose, should be placed round the building, and also carried within, capable of throwing a jet to any part of the interior.

 "131. Regulations

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" 131. Regulations giving effect to these conditions should be drawn up by the Metropolitan Board, and, so far as possible, be applied to all new buildings, though absolute uniformity would, your Committee apprehend, be unattainable. Existing buildings would be exempted, but (in accordance with the precedent of the Mines Act and Explosives Act) power should be reserved to the Metropolitan Board, if of opinion that the structure or permanent arrangements were dangerous, to require the necessary alteration to be made, the proprietor, if he objects, being entitled to refer the matter to arbitration. Music-halls not capable of containing more, say, than 50 persons, should be exempted altogether.

1759, 1760 B.

" 132. With respect to the daily management of the theatre, naked lights should be protected; inflammable materials should not be allowed to be placed where they are likely to catch fire; the hose and other apparatus should be maintained in good order; the passages should be kept clear, and a plan settled beforehand of what should be done in the case of a fire or panic, each of the employés being instructed as to the place he is to take, and the duties he is to perform, and all being occasionally drilled together for the purpose.

2766. 2031.

" 133. In order to insure these precautions being taken, the licensing authority should be empowered to draw up rules applicable in the one case to all theatres, whether old or new, and in the other to all music-halls, except the smaller ones, which would be exempted. Breach of rules should be punished by fine on summary prosecution. Inspection of some sort would also from time to time be necessary; and for this purpose the necessary legal powers should be given. Your Committee do not recommend either that firemen from the Brigade should be constantly present, in order, if occasion should arise, to put into operation the apparatus for the extinction of fire, or that the daily enforcement of the rules of a licensing authority should be assigned to the police. Your Committee are satisfied that these duties can be most effectually, as well as most economically, discharged by the regular employés of the theatre, acting immediately under the eye and orders of the manager, and deem it inexpedient to relieve the managers of any of the responsibility that properly belongs to them.

" VII.—CONCLUSIONS.

" 134. Your Committee would sum up their conclusions as follows:

" 1. That the statutory arrangements for the extinction of fires in the metropolis, whereby the Fire Brigade is administered by the Metropolitan Board of Works, two separate police forces exist side by side, and the water supply is sectionally furnished by eight independent companies, are not such as to furnish adequate protection to life and property; and contrast unfavourably with provincial systems, where the fire brigade, water supply, and police are under a single authority; and that consolidation of management, so far as is practicable, is urgently required.

" 2. That the Fire Brigade should be transferred from the Metropolitan Board to the Commissioner of Police for the metropolis, so, however, as to constitute a distinct branch to be placed under the immediate command of a separate Assistant Commissioner, and to be authorised to act within the City of London as well as in the metropolis.

" 3. That the members of the Fire Brigade should be entitled to superannuation on the same terms as those applying to other constables of the Metropolitan police force, liberal provision being made for those now serving in the Brigade.

" 4. That the police stations and the fixed points should be used as Fire Brigade stations, or as places where small engines or other appliances should be deposited, and that all police constables, both of the metropolis and City, should be auxiliary to the Fire Brigade, but that, as now, each force should be empowered to act only within its own jurisdiction except on a special requisition.

" 5. That in lieu of the limit of one halfpenny on the consolidated rate, there should be substituted a limit of a penny rate on the Metropolitan Police District.

" 6. That the contribution from the insurance companies should be continued at the present rate, and that a charge should be levied on owners of uninsured property saved from fire.

" 7. That hydrants should, without delay, be affixed to mains and service-pipes wherever there is a constant supply, and should follow the extension of such supply.

" 8. That the water systems now belonging to the various companies should be consolidated in the hands of a public authority, which, in dealing with the questions of constant supply, pressure, and pipage, should be bound to have regard not only to the convenience of consumers, but also to the requirements for the extinction of fire.

" 9. That no new theatre or large music-hall in the metropolis should be finally licensed

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licensed until certified that, in respect of position and structure, it satisfies all due requirements for the protection against danger from fire, and that the Metropolitan Board should be the certifying authority.

" 10. That with respect to existing theatres and halls, the Metropolitan Board should have power to call on the proprietor to remedy such structural defects as appear to the Board to be the cause of special danger, and to admit of being remedied by a moderate expenditure, option being allowed to the proprietor to refer the whole question to arbitration.

" 11. That with a view to the prevention of danger from fire, the Lord Chamberlain and the justices should be authorised to make regulations as to the management of theatres and music-halls under their jurisdiction ; that for the purpose of ascertaining whether such regulations are complied with, provision should be made for the inspection of these buildings, and that any breach of the regulations should be punishable on summary prosecution.

" 12. That effect should be given by the Legislature to these recommen dations."

DRAFT REPORT proposed by the Chairman, read a second time, paragraph by paragraph.

Paragraph 1, amended, and *agreed to.*

Paragraph 2, *agreed to.*

Paragraph 3, amended, and *agreed to.*

Paragraphs 4 and 5, *agreed to.*

Paragraph 6, amended.—Another Amendment proposed, at the end of the paragraph, to add the words, " No provision was made in this scheme for working the fire-escapes, which were not at that time proposed to be taken over by the Metropolitan Board "—(Mr. *Ritchie*).—Question proposed, That those words be there added.—Whereupon, Amendment proposed to proposed Amendment, to leave out the words " in this scheme "—Mr. *Onslow*).—Question put, That the words proposed to be left out stand part of the proposed Amendment.—The Committee divided:

Ages, 9.	Noes, 5.
Mr. Ritchie.	Mr. Onslow.
Sir James M'Garel-Hogg.	Lord Lindsay.
Mr. John Stewart Hardy.	Sir Henry Peek.
Mr. Hankey.	Mr. Clifton.
Mr. Hayter.	Marquis of Tavistock.
Mr. Hardcastle.	
Mr. M'Lagan.	
Mr. Forsyth.	
Sir Andrew Lusk.	

Question, That the proposed words be there added—put and *agreed to.*

Paragraph, as amended, *agreed to.*

Paragraphs 7—9, *agreed to.*

Paragraph 10, amended, and *agreed to.*

Paragraphs 11—17, *agreed to.*

Paragraph 18, amended, and *agreed to.*

Paragraphs 19—24, *agreed to.*

Paragraph 25, amended, and *agreed to.*

Paragraphs 26 and 27, *agreed to.*

Paragraph 28.—Question put, That this paragraph stand part of the proposed Report.—The Committee divided:

Ayes, 11.	Noes, 3.
Mr. Ritchie.	Sir Henry Peek.
Mr. Onslow.	Mr. Forsyth.
Lord Lindsay.	Sir Andrew Lusk.
Marquis of Tavistock.	
Sir James M'Garel-Hogg.	
Mr. John Stewart Hardy.	
Mr. Hankey.	
Mr. Hayter.	
Mr. Hardcastle.	
Mr. M'Lagan.	
Mr. Kinnaird.	

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Paragraph 29.—Amendment proposed, in line 8, to leave out from the word "utilised" to the word "adopted," in line 9, in order to insert the words, "as auxiliaries to the Brigade, and if an improved system of constant water supply, under really high pressure, could be established by the Metropolitan Board of Works, with hydrants upon all the mains and services"—(Sir *James M'Garel-Hogg*),—instead thereof.—Question proposed, That the words proposed to be left out stand part of the paragraph.—Amendment and Question, by leave, *withdrawn*.

Paragraph *agreed to*.

Paragraph 30, *agreed to*.

Paragraph 31, amended, and *agreed to*.

Paragraph 32, amended.—Another Amendment proposed, in line 11, to leave out the words, "that these complaints were substantiated in the case of the Farringdon-street and Sloane-square stations," in order to insert the words "however, that these complaints can hardly be said to have been substantiated. They think, moreover, that the Metropolitan Board of Works acted to the best of its judgment in re-distributing the stations in the way complained of by the insurance companies"—(Sir *James M'Garel-Hogg*),—instead thereof.—Question put, That the words proposed to be left out stand part of the paragraph.—The Committee divided:

Ayes, 9.	Noes, 4.
Mr. Ritchie.	Sir James M'Garel-Hogg.
Mr. Onslow.	Mr. Hayter.
Sir Henry Peek.	Mr. Hardcastle.
Mr. Clifton.	Sir Andrew Lusk.
Marquis of Tavistock.	
Mr. John Stewart Hardy.	
Mr. Hankey.	
Mr. Kinnaird.	
Mr. Locke.	

Paragraph, as amended, *agreed to*.

Paragraphs 33 and 34, amended, and *agreed to*.

Paragraph 35.—Amendment proposed, at the end of the paragraph, to add the words, "The desirability of establishing telegraphic communication between every police station and the fire brigade station nearest to it has been pointed out to the Metropolitan Board by the fire offices, but no steps have been taken by the Board to carry this out"—(Mr. *Ritchie*).—Question proposed, That those words be there added.—Amendment and Question, by leave, *withdrawn*.

Paragraph *agreed to*.

Paragraph 36, *agreed to*.

Paragraphs 37 and 38, amended, and *agreed to*.

[Adjourned till Monday next, at Twelve o'clock.

Monday, 16*th July* 1877.

MEMBERS PRESENT:

Sir HENRY SELWIN IBBETSON in the Chair.

Mr. Ritchie.	Sir Andrew Lusk.
Mr. Onslow.	Mr. Hankey.
Sir Henry Peek.	Mr. Hayter.
Mr. Clifton.	Mr. Hardcastle.
Marquis of Tavistock.	Mr. M'Lagan.
Sir James M'Garel-Hogg.	Mr. Forsyth.
Mr. John Stewart Hardy.	Mr. Kinnaird.
Mr. Young.	Lord Lindsay.

Paragraphs 39 and 40, amended, and *agreed to*,

Paragraph 41.—Amendment proposed, in line 7, after the words "200 men," to insert the words "nearly all of whom, have in some cases of large fires, been employed at one fire; thus leaving the whole of the other parts of the metropolis dependent on the few men left on station duty"—(Mr. *Ritchie*).—Question proposed, That those words be there inserted:—Whereupon, Amendment proposed to the proposed Amendment, to leave out the words "nearly all," in order to insert the word "many"—(Sir *James*

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James M'Garel-Hogg)—instead thereof.—Question put, That the words "nearly all" stand part of the proposed Amendment.—The Committee divided:

Ayes, 7.	Noes, 5.
Mr. Ritchie.	Sir James M'Garel-Hogg.
Mr. Onslow.	Sir Andrew Lusk.
Sir Henry Peek.	Mr. Hankey.
Mr. Clifton.	Mr. Hardcastle.
Mr. Hayter.	Mr. M'Lagan.
Mr. Forsyth.	
Mr. Kinnaird.	

Question put, That the proposed words be there inserted.—The Committee divided:

Ayes, 11.	Noes, 3.
Mr. Ritchie.	Sir James M'Garel-Hogg.
Mr. Onslow.	Sir Andrew Lusk.
Sir Henry Peek.	Mr. M'Lagan.
Mr. Clifton.	
Marquis of Tavistock.	
Mr. Young.	
Mr. Hankey.	
Mr. Hayter.	
Mr. Hardcastle.	
Mr. Forsyth.	
Mr. Kinnaird.	

Another Amendment proposed, in line 7, to leave out the words "whereas in Liverpool it amounts to 100" –(Mr. *Hardcastle*).—Question put, That the words proposed to be left out stand part of the paragraph.—The Committee divided:

Ayes, 6.	Noes, 8.
Mr. Ritchie.	Marquis of Tavistock.
Mr. Onslow.	Sir James M'Garel-Hogg.
Sir Henry Peek.	Sir Andrew Lusk.
Mr. Clifton.	Mr. Hankey.
Mr. Young.	Mr. Hayter.
Mr. Kinnaird.	Mr. Hardcastle.
	Mr. M'Lagan.
	Mr. Forsyth.

Paragraph further amended, and *agreed to*.

Paragraph 42, *agreed to*.

Paragraph 43.—Amendment proposed, in line 5, to leave out from the word "given" to the word "Earnings," in line 7—(Mr. *Hardcastle*).—Question put, That the words proposed to be left out stand part of the paragraph.—The Committee divided:

Ayes 8.	Noes 5.
Mr. Ritchie.	Sir James M'Garel-Hogg.
Mr. Onslow.	Sir Andrew Lusk.
Sir Henry Peek.	Mr. Hankey.
Mr. Clifton.	Mr. Hayter.
Marquis of Tavistock.	Mr. Hardcastle.
Mr. Young.	
Mr. Forsyth.	
Mr. Kinnard.	

Another Amendment proposed, in line 7, after the word "Earnings," to insert the words "a representation, however, which was not confirmed by the chief officer of the Fire Brigade, who reported on the case"—(Sir *James M'Garel-Hogg*).—Question put, That those words be there inserted.—The Committee divided:

Ayes, 4.	Noes, 9.
Sir James M'Garel-Hogg.	Mr. Ritchie.
Sir Andrew Lusk.	Mr. Onslow.
Mr. Hardcastle.	Sir Henry Peek.
Mr. Forsyth.	Mr. Clifton.
	Marquis of Tavistock.
	Mr. Young.
	Mr. Hankey.
	Mr. Hayter.
	Mr. Kinnaird.

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Another Amendment proposed at the end of the paragraph to add the words "which on a representation by Captain Shaw that this sum was quite insufficient, the Fire Brigade Committee recommended should be increased to 7*l.* 10*s.*, a recommendation which was not, however, adopted by the Board"—(Mr. *Ritchie*).—Question put, That those words be there added.—The Committee divided:

Ayes, 9.	Noes, 4.
Mr. Ritchie.	Sir James M'Garel-Hogg.
Mr. Onslow.	Sir Andrew Lusk.
Sir Henry Peek.	Mr. Hankey.
Mr. Clifton.	Mr. Hardcastle.
Marquis of Tavistock.	
Mr. Young.	
Mr. Hayter.	
Mr. Forsyth.	
Mr. Kinnaird.	

Paragraph, as amended, *agreed to.*

Paragraph 44, *agreed to.*

Paragraph 45.—Amendment proposed, in line 1, to leave out the words "and not without reason"—(Sir *Andrew Lusk*).—Question put, That the words "and not without reason," stand part of the paragraph.—The Committee divided:

Ayes, 12.	Noes, 2.
Mr. Ritchie.	Sir James M'Garel-Hogg.
Mr. Onslow.	Sir Andrew Lusk.
Sir Henry Peek.	
Mr. Clifton.	
Marquis of Tavistock.	
Mr. John Stewart Hardy.	
Mr. Young.	
Mr. Hankey.	
Mr. Hayter.	
Mr. Hardcastle.	
Mr. Forsyth.	
Mr. Kinnaird.	

Another Amendment proposed, in line 3, to leave out the words "the first"—(Mr. *Ritchie*).—Question put, That the words "the first" stand part of the paragraph.—The Committee divided:

Ayes 14.	Noe, 1.
Mr. Onslow.	Mr. Ritchie.
Sir Henry Peek.	
Mr. Clifton.	
Marquis of Tavistock.	
Sir James M'Garel-Hogg.	
Mr. John Stewart Hardy.	
Mr. Young.	
Sir Andrew Lusk.	
Mr. Hankey.	
Mr. Hayter.	
Mr. Hardcastle.	
Mr. Forsyth.	
Mr. Kinnaird.	
Lord Lindsay.	

Another Amendment proposed, in line 13, to leave out the words "The grievance may therefore be taken to be at last disposed of"—(Mr. *Hayter*).—Question put, That the words proposed to be left out stand part of the paragraph.—The Committee divided:

Ayes, 2.	Noes, 12.
Sir James M'Garel-Hogg.	Mr. Ritchie.
Sir Andrew Lusk.	Mr. Onslow.
	Sir Henry Peek.
	Mr. Clifton.
	Marquis of Tavistock.
	Mr. John Stewart Hardy.
	Mr. Young.
	Mr. Hankey.
	Mr. Hayter.
	Mr. Hardcastle.
	Mr. Kinnaird.
	Lord Lindsay.

Paragraph, as amended, *agreed to.*

Paragraph

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Paragraph 46.—Amendment proposed, in line 3, after the word "any," to insert the word "absolute"—(Mr. *Ritchie*).—Question put, That the word "absolute" be there inserted.—The Committee divided:

Ayes, 7.	Noes, 6.
Mr. Ritchie.	Marquis of Tavistock.
Mr. Onslow.	Sir James M'Garel-Hogg.
Sir Henry Peek.	Sir Andrew Lusk.
Mr. Clifton.	Mr. Hayter.
Mr. Young.	Mr. Hardcastle.
Mr. Hankey.	Mr. Forsyth.
Lord Lindsay.	

Another Amendment proposed, in line 4, to leave out the words "and therefore that the men in demanding superannuation, were in fact demanding for themselves an increase of pay"—(Mr. *Ritchie*).—Question put, That the words proposed to be left out stand part of the paragraph.—The Committee divided:

Ayes, 5.	Noes, 8.
Marquis of Tavistock.	Mr. Ritchie.
Sir James M'Garel-Hogg.	Mr. Onslow.
Sir Andrew Lusk.	Sir Henry Peek.
Mr. Hayter.	Mr. Clifton.
Mr. Hardcastle.	Mr. Young.
	Mr. Hankey.
	Mr. Forsyth.
	Lord Lindsay.

Paragraph further amended, and *agreed to.*

Paragraph 47.—Amendment proposed, in line 6, to leave out from the words "adhered to" to the end of the paragraph—(Mr. *Onslow*).—Question put, That the words proposed to be left out stand part of the paragraph.—The Committee divided:

Ayes, 9.	Noes, 4.
Marquis of Tavistock.	Mr. Ritchie.
Sir James M'Garel-Hogg.	Mr. Onslow.
Mr. Young.	Sir Henry Peek.
Sir Andrew Lusk.	Mr. Clifton.
Mr. Hankey.	
Mr. Hayter.	
Mr. Hardcastle.	
Mr. Forsyth.	
Lord Lindsay.	

Paragraph *agreed to.*

Paragraphs 48-51, *agreed to.*

Paragraph 52.—Amendment proposed, in line 3, after the word "considered" to insert the words, "And apart also from the fact that a large portion of the metropolis requiring protection lies outside the jurisdiction of the Metropolitan Board of Works"—(Mr. *Ritchie*).—Question, That those words be there inserted,—put, and *agreed to.*

Another Amendment proposed, in line 17, to leave out from the words "200 men," to the end of the paragraph, in order to add the words, "most of these defects, however, would, in the opinion of your Committee, be remedied, if, in addition to the extension of the Brigade already recommended, the police force and the police stations, and fixed points were utilized as auxiliaries to the Brigade, and if a complete system of telegraphs were established between the police stations and fixed points, and the fire engine and fire escape stations"—(Sir *James M'Garel-Hogg*)—instead thereof.—Question put, That the words proposed to be left out stand part of the paragraph.—The Committee divided:

Ayes, 10.	Noes, 4.
Mr. Ritchie.	Sir James M'Garel-Hogg.
Mr. Onslow.	Sir Andrew Lusk.
Sir Henry Peek.	Mr. Hardcastle.
Mr. Clifton.	Mr. Forsyth.
Marquis of Tavistock.	
Mr. Young.	
Mr. Hankey.	
Mr. Hayter.	
Mr. Kinnaird.	
Lord Lindsay.	

Paragraph, as amended, *agreed to.*

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Paragraphs 53—58, *agreed to.*

Paragraph 59.—Amendment proposed to leave out from the first word "The" to the end of the paragraph, in order to add the words: "Committee, after careful consideration of all the opinions expressed on this point, are of opinion that the objections to an amalgamation of the Fire Brigade with the Metropolitan Police are grave and weighty, whilst the advantages expected to arise from it would equally result from a utilisation of the police organisation as auxiliary to the Fire Brigade, without the abolition of their separate existence. The Fire Brigade has been more than eleven years under the control of the Metropolitan Board of Works, a body representing the ratepayers, at whose cost the Brigade is mainly kept up, and it would be a serious departure from the representative principle in local administration to transfer the control of this municipal force from the local representative authority to a Government department. There is the further objection that in London two separate police forces exist under separate management, the metropolitan police force being under the control of the Secretary of State for the Home Department, and the police of the City of London under the Corporation of that City. Great dislike, moreover, is felt by the City of any interference by the State authorities with the City territory and jurisdiction. Supposing, then, what is at least doubtful, that advantages would result from a complete union of the Police and the Fire Brigade which could not be otherwise attained, it is clear that so long as a separate police force exists in the City no such amalgamation could be complete. It is, therefore, inexpedient to make any radical alteration in the present system, which has worked well for many years, and under which the relations between the Police and the Fire Brigade are, as has been already stated, of a cordial and harmonious character. Provision should, however, be made for utilising the police organisation for fire-extinguishing purposes as far as possible"—(Sir *James M'Garel-Hogg*),—instead thereof.—Question put, That the words "objections taken to the employment of the police," stand part of the paragraph.—The Committee divided:

Ayes, 10.	Noes, 3.
Mr. Ritchie.	Sir James M'Garel-Hogg.
Mr. Onslow.	Sir Andrew Lusk.
Sir Henry Peek.	Mr. Hardcastle.
Mr. Clifton.	
Marquis of Tavistock.	
Mr. Young.	
Mr. Hankey.	
Mr. Hayter.	
Mr. Kinnaird.	
Lord Lindsay.	

Paragraph *agreed to.*

Paragraph 60.—Question put, That this paragraph stand part of the proposed Report.—The Committee divided:

Ayes, 10.	Noes, 3.
Mr. Ritchie.	Sir James M'Garel-Hogg.
Mr. Onslow.	Sir Andrew Lusk.
Sir Henry Peek.	Mr. Hardcastle.
Mr. Clifton.	
Marquis of Tavistock.	
Mr. Young.	
Mr. Hankey.	
Mr. Hayter.	
Mr. Kinnaird.	
Lord Lindsay.	

Paragraphs 61—63, *agreed to.*

Paragraph 64, amended and *agreed to.*

Paragraphs 65—71, *agreed to.*

Paragraphs 72 and 73, amended, and *agreed to.*

Paragraphs 74 and 75, *agreed to.*

Paragraphs 76 and 77, amended and *agreed to.*

Paragraphs 78—95, *agreed to.*

Paragraph 96, amended, and *agreed to.*

Paragraphs 97 and 98, *agreed to.*

Paragraph 99.—Amendment proposed to leave out from the word "police," in line 7, to the end of the paragraph—(Sir *James M'Garel-Hogg*).—Question put, That the

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the words proposed to be left out stand part of the paragraph.—The Committee divided:

Ayes, 10.	Noes, 3.
Mr. Ritchie.	Mr. James M'Garel-Hogg.
Mr. Onslow.	Sir Andrew Lusk.
Sir Henry Peek.	Mr. Hardcastle.
Mr. Clifton.	
Marquis of Tavistock.	
Mr. John Stewart Hardy.	
Mr. Young.	
Mr. Hankey.	
Mr. Hayter.	
Mr. Kinnaird.	

Paragraph *agreed to.*

Paragraph 100, amended, and *agreed to.*

Paragraphs 101—103, *agreed to.*

Paragraph 104, amended, and *agreed to.*

Paragraphs 105—120, *agreed to.*

Paragraph 121, amended, and *agreed to.*

Paragraphs 122—133, *agreed to.*

Paragraph 134.—Amendment proposed, in sub-section 1, to leave out from the word "Metropolis," in line 1, to the end of the sub-section, in order to add the words, "are imperfect, in so far as the Metropolitan Board of Works has no control over the supply of water, which is an essential element in any efficient fire service; that in this respect the metropolitan system contrasts unfavourably with those provincial systems where the fire brigade and water supply are under a single authority; and that with a view to consolidation of management, it is desirable that the water supply should be under the same municipal authority as the fire brigade"—(Sir *James M'Garel-Hogg*),—instead thereof.—Question put, That the words proposed to be left out stand part of the paragraph.—The Committee divided:

Ayes, 10.	Noes, 3.
Mr. Ritchie.	Sir James M'Garel-Hogg.
Mr. Onslow.	Sir Andrew Lusk.
Sir Henry Peek.	Mr. Hardcastle.
Mr. Clifton.	
Marquis of Tavistock.	
Mr. John Stewart Hardy.	
Mr. Young.	
Mr. Hankey.	
Mr. Hayter.	
Mr. Kinnaird.	

Amendment, proposed in Sub-section 2, to leave out from the word "That," in line 1, to the end of the sub-section, in order to add the words, "The organisation of the Metropolitan Police Force might with great advantage be utilised as an auxiliary to the Fire Brigade; and more especially that at the police stations and fixed points such appliances should be kept as are necessary for the suppression of fires at their commencement; that the constables should be trained in the use of these appliances so as to be able to use them promptly and with effect; and that the police stations and fixed points should all be in communication by telegraph with the nearest fire engine and fire escape stations"—(Sir *James M'Garel-Hogg*),—instead thereof.—Question put, That the words proposed to be left out stand part of the paragraph.—The Committee divided:

Ayes, 10.	Noes, 3.
Mr. Ritchie.	Sir James M'Garel-Hogg.
Mr. Onslow.	Sir Andrew Lusk.
Sir Henry Peek.	Mr. Hardcastle.
Mr. Clifton.	
Marquis of Tavistock.	
Mr. John Stewart Hardy.	
Mr. Young.	
Mr. Hankey.	
Mr. Hayter.	
Mr. Kinnaird.	

Amendment proposed in Sub-section 5, at the end of the sub-section, to add the words

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words "and that the Government contribution should be reconsidered"—(Mr. *Ritchie*).—Question, That those words be there added,—put, and *agreed to.*

Amendment proposed, in Sub-section 6, in line 2, to leave out from the word "rate" to the end of the sub-section—(Mr. *Hardcastle*).—Question put, That the words proposed to be left out stand part of the paragraph.—The Committee divided:

Ayes, 9.	Noes, 4.
Mr. Ritchie.	Mr. Clifton.
Mr. Onslow.	Mr. John Stewart Hardy.
Sir Henry Peek.	Mr. Hankey.
Marquis of Tavistock.	Mr. Hardcastle.
Sir James M'Garel-Hogg.	
Mr. Young.	
Sir Andrew Lusk.	
Mr. Hayter.	
Mr. Kinnaird.	

Amendment proposed, in Sub-section 7, to leave out from the word "That," in line 1, to the end of the sub-section, in order to add the words, "whilst hydrants might be of great value with a constant high pressure water service, it would, in the present imperfect condition of the water supply of the Metropolis as regards the extinction of fires, be inexpedient to incur the large expenditure which would be entailed by fixing hydrants upon all the constantly charged mains and service pipes in the Metropolis"—(Sir *James M'Garel-Hogg*)—instead thereof.—Question put, That the words proposed to be left out stand part of the paragraph.—The Committee divided:

Ayes, 10.	Noes, 3.
Mr. Ritchie.	Sir James M'Garel-Hogg.
Mr. Onslow.	Sir Andrew Lusk.
Sir Henry Peek.	Mr. Hardcastle.
Mr. Clifton.	
Marquis of Tavistock.	
Mr. John Stewart Hardy.	
Mr. Young.	
Mr. Hayter.	
Mr. Hankey.	
Mr. Kinnaird.	

Amendment proposed, to strike out Sub-section 8—(Mr. *John Stewart Hardy*).—Question put, That Sub-section 8 stand part of the paragraph.—The Committee divided:

Ayes, 9.	Noes, 3.
Mr. Onslow.	Mr. John Stewart Hardy.
Sir Henry Peek.	Mr. Young.
Mr. Clifton.	Sir Henry Lusk.
Marquis of Tavistock.	
Sir James M'Garel-Hogg.	
Mr. Hankey.	
Mr. Hayter.	
Mr. Hardcastle.	
Mr. Kinnaird.	

Motion made, and Question put, That this paragraph, as amended, stand part of the proposed Report.—The Committee divided:

Ayes, 10.	Noes, 3.
Mr. Ritchie.	Sir James M'Garel-Hogg.
Mr. Onslow.	Sir Andrew Lusk.
Sir Henry Peek.	Mr. Hardcastle.
Mr. Clifton.	
Marquis of Tavistock.	
Mr. John Stewart Hardy.	
Mr. Young.	
Mr. Hankey.	
Mr. Hayter.	
Mr. Kinnaird.	

Question, "That this Report as amended, be the Report of the Committee to the House,"—put, and *agreed to.*

Ordered, To Report, together with Minutes of Evidence, and an Appendix.

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MINUTES OF EVIDENCE.

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MINUTES OF EVIDENCE.

Monday, 19*th March* 1877.

MEMBERS PRESENT:

Mr. Forsyth.	Mr. M'Lagan.
Sir Wm. Fraser.	Mr. Onslow.
Mr. Hankey.	Sir Henry Peek.
Mr. Hardcastle.	Mr. Ritchie.
Mr. Herbert.	Sir Henry Selwin-Ibbetson.
Sir James M'Garel-Hogg.	Mr. Stevenson.
Mr. Kinnaird.	Marquis of Tavistock.
Mr. Locke.	

SIR HENRY SELWIN-IBBETSON, BART., IN THE CHAIR.

Mr. *Edwin Chadwick*, C.B., called in; and Examined.

1. *Chairman.*] You appear on behalf of the Committee of the Society of Arts, I believe?—I appear as a member of the special committee appointed by the council to inquire into the means of preventing the extension of ordinary fires and of averting conflagrations in the metropolis.

2. Are you prepared to state their views of what may be done for the protection of life and property from fire?—I have the honour to be Chairman of that special committee. I was asked to take that part in the committee in consequence of the part I had taken before on this subject. In 1839 I was a member of a commission appointed to examine into the functions of the police force of the provinces, and in that capacity we examined very closely all the functions of a preventive police, and amongst those was the prevention of fire. In 1849 it was referred to us, of the General Board of Health, to examine into the water supply specially of the metropolis, and on that occasion the question of what provision could be made for the prevention of fires by an arrangement of the water supply was, I think, very thoroughly examined. We examined, amongst others, Mr. Braidwood. We elaborated at that time (1850) principles of works and of administration for the metropolis which have since then been followed in various provincial towns. I may mention that since that time, and in connection with this committee of the Society of Arts, in my own interest of this subject, I have paid visits to Manchester and to Glasgow.

3. Mr. Braidwood had, through his officers, a good deal to do with the starting of these fire brigades in these towns, had he not?—Yes; several officers who were trained under him were appointed at Manchester, Liverpool, and, I believe, other places; he was considered as an authority on the subject of fire prevention, and his organisations are much respected down to this time.

4. Have the Society of Arts made any inquiry into this subject since 1849?—Yes, we have had a very advanced inquiry. We examined, with leave from the Local Government Board, the Government officers, Mr. Robert Rawlinson and Captain Tyler, who were specially conversant with water supplies as well as other related questions. Mr. Rawlinson, as an engineer, has planned and executed works for a number of towns.

5. Captain Tyler is the officer of the Board of Trade?—Yes, Captain Tyler is

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Mr. *E. Chadwick*, C.B.

19 March 1877.

the officer of the Board of Trade under whom the water supply was at one time, before it was transferred to the Local Government Board.

6. I understand you had also on that inquiry Mr. Quick?—Mr. Quick was the engineer for the Southwark and Vauxhall and the Grand Junction Companies; he is also a man of very considerable European practice in regard to the cities of the continent.

7. Did you on that inquiry go into the question of the working of the different systems at Manchester and Glasgow, and other towns?—We did sufficiently, I think.

8. What was the opinion you came to as the result of the inquiry with regard to the working of the brigades in those towns, that it was satisfactory for the prevention of fire or otherwise?—That the measures proposed of a constant supply, on a public footing with hydrants in the streets, and special forces, under the general police of the towns, were satisfactory in a high degree; that is to say, it generally resulted in Manchester, in Glasgow, and in Liverpool, in this,—that the proportion of calls for engine power or horse engines, what we should term brigade calls, was reduced to about 3 or 4 per cent. of the cases such as occur in the metropolis.

9. They have in those towns a constant supply of water to work with, have they not?—Yes, they have.

10. And I suppose it was part of their evidence that that constant supply was necessary to the working of the system that they had in force?—Yes; and further than that, that the constant supply should be placed on a public footing, as well for the better distribution and economy of water, as for the extended applications of it at the cost of the service, and freedom from questions of exactions for wasting profits.

11. In those towns the brigade was carried on on a constant supply of water, that water being supplied by the local authority?—By the local authority.

12. And with a high pressure?—Yes, and with the result of an enormous economy of water. At Manchester the economy of water was reduced from about 33 gallons, the metropolitan proportion, to about 20 gallons per head per day.

13. That was after they had got the high pressure and unity of action?—Yes.

14. Have you seen the evidence which has been given before this Committee asserting that it is impossible to apply this experience to the metropolis?—I have, and I have seen it with a good deal of surprise. I see that Sir Joseph Bazalgette says, in answer to Questions 5644 and 5645, that "hydrants cannot be applied to assist the engines in extinguishing fires." Then he is asked, "And for that reason your advice to the Metropolitan Board of Works is against the application of hydrants?" His answer is, "I think, at the present time, hydrants would be of no use to them whatsoever." Now I am prepared to state that if water were delivered at the lowest amount of pressure recited in that evidence, it would nevertheless be of very great importance to have hydrants applied. If the water were delivered only to the basement of a house it would be of great advantage to have hydrants with hose to lead up to the door at once, instead of forming what the French call a "queue" of people to hand buckets to each other. That would be of great use even if no more were done. In Manchester, with the use of a pail, with a small hand pump, the fire brigade extinguish some 70 per cent. of the fires; that was Mr. Tozer's statement to me, that there was a great diminution of calls for the brigade, and that fires were in such large proportions immediately extinguished by the police; and so it might be in the metropolis.

15. That is to say, that by the application of water on the spot a fire can be extinguished more quickly than an engine can arrive upon the scene?—Quite so, in the great majority of occurrences; and that is without any pressure more than sufficient to reach from the hydrant, by the hose, to a pail at the door; because with the pail alone, and with a hand pump, as stated by Mr. Tozer, they have put out fully 70 per cent. of the fires which have occurred there.

16. At the same time at Manchester they have a higher pressure?—They have a far higher pressure than that now given on a large proportion of the metropolitan area, but in this case for merely leading the water to the door, a low pressure would suffice, without any question of a high pressure, important as that is for a complete service.

17. Do

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17. Do you mean by that that the police on duty could avail themselves of the constant supply, and even use it in buckets for the better extinguishing of fire?—That is what they do in Manchester, and by that means they put out, I say, two-thirds of the fires before any brigade engine could be summoned.

18. I believe the fire brigade in Manchester are part of the police?—They are under the general control of the police force.

19. Are the police entrusted when on duty with appliances, such as buckets or hose, which they can bring to bear upon a fire breaking out on their beat?—Yes, they are. At one time it was considered the special duty of the fire brigade alone to extinguish fire, and up to 1866 the police were absolutely paid for keeping the fires in until the brigade arrived to put them out; they were not to interfere with them until the fire brigade came up. It is the evidence of Mr. Tozer that up to that time the fire brigade paid a considerable sum in rewards to the police for keeping the fires in for the brigade instead of putting them out.

20. Was that in regard to Manchester?—No, in London.

21. That goes back to some time ago, does it not?—No, it was only put a stop to in 1866, when an Act was passed which put a stop to it. On the other hand, in Manchester the police have a reward for every fire they put out, and they have extra rewards if it is what is called a "good stop;" that is to say, if they stop a fire immediately, they have a reward which is left to the discretion of the chief of the police, and if there is a saving of life, they have a reward from the Royal Humane Society.

22. Is it a part of the system of the police force in Manchester that the municipality pay their police rewards for the rapid extinguishing of fire?—Yes; so I understood it.

23. And with that combined with the appliances which they have put into the hands of the police force, they have reduced the number of serious fires in the proportion you have stated?—Yes, in the proportion I have stated. They first attach a hose to the hydrant very quickly while the fire may be going on, and then, if necessary, they send for a reel or other engine to the police station, and if the fire is serious, a call is sent to the brigade station for its steam or larger manual engines. The policeman, if he is near a hydrant, may get it to bear in about two minutes. Mr. Braidwood laid it down as a fundamental rule that fire-escapes, or anything else so save life and property in a house, were of no avail unless brought within five minutes. In his time it took 20 minutes, but by telegraph and by other means, I believe, the time is now reduced to about 15 minutes, and still it is twice or three times longer than should be necessary; but in those cases where you have the hydrant at the door, the water may be brought to bear within two minutes upon a house which is on fire.

24. That is to say, by the application of these preliminary means, if we may call them so, you bring the water to bear upon a fire more quickly than it is possible you can bring an engine to bear upon it from the station?—By many degrees; and with the discipline of the brigade or the police force, you may expedite the matter very considerably beyond the time in which it is now done.

25. And by those means you may often really put out, in its first stage, what may have become a serious fire when the engine arrives?—The losses from fires in Manchester are reduced to one-third of what they were; and I believe in Liverpool the losses are reduced in a still larger proportion. I was consulted about that by Mr. Rushton, the stipendiary magistrate for Liverpool. I recommended the use of hydrants, and they were in time adopted there.

26. With regard to the metropolis and its present water supply, a large part of the metropolis has sufficient jets of that kind, has it not, at the present time?—A large proportion of mains under a good pressure, sufficient for the immediate application of hydrants. We had experiments made by Mr. Quick at my instance of the pumping power from the station at Battersea, to see what sort of jets could be got in Southwark, and 40 or 50-feet jets were then to be obtained; but the pressure has, I am informed, been increased since then, and in the rest of the metropolis I believe you will find, I expect, according to the testimony of the engineer officers of other large districts, that it is so. Recently, in the City, trials have been made, and they found that very good jets, sufficient for the immediate use of hydrants, may be got at present.

27. That result would be very much strengthened, would it not, by unity of

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action, as it was in Manchester?—Unity of works and action in London is the great topic which, it may be submitted, has yet to be taken into consideration. By unity of works and of action you will bring to bear over the whole area the pressure of the highest points of discharge which there are. Mr. Quick, who is well acquainted with the subject, says that by unity over the whole of the metropolis, an addition may be made of fully one-third to that obtainable under the existing arrangement. The experience which he obtained in 1848 was, that the hydrants gave about 50 or 60-feet jets in Southwark, and that, under unity, on occasions those jets could be increased by one-third, and attain an elevation of, perhaps, 70 or 80 feet, or even more, and that without any other alteration of the existing system of supply.

28. You mean that, without altering the present system of supply, but simply by uniting the companies, and therefore getting the force of the highest point of any of the companies, you would produce that result?—Yes. Mr. Quick will, if needed, give all the particulars he has given to us.

29. And Mr. Quick, as I understand, was formerly acquainted with the working of two of the companies in London, and has considered this question?—He was until recently engineer of the Grand Junction Water Company, and also of the Southwark and Vauxhall Water Company; and I think, as far as we have been informed, that he would best represent what the existing forces may do.

30. Are you aware that engineers who have been examined before this Committee have stated that the pressure would not amount to that even with unity of action?—I have neither seen nor heard of any exposition, by any other specialist, of the gains in pressure or economy derivable from unity of works in the metropolis. But that the present pressures over the greater proportion of the metropolis would suffice for the immediate beneficial application of hydrants, with the constant supply, is very certain. It is also very certain that there would be a large addition of pressure, Mr. Quick says about a third, gained by unity in giving to the lowest the pressure of the higher or of the highest works united. Probably there might be here and there some blocks of houses and some higher places in the metropolis in which the pressure is very low, in which it is just sufficient to deliver the water into the basement or into the first storey, but over two-thirds of the metropolis, according to all the experience of the firemen, such as the Committee will have heard from Mr. Swanton and others, the pressure is adequate to jets sufficient for hydrants; in fact, the pressure at some points is enormous; there are, in fact, instances where men have been killed by plugs being blown out of the mains.

31. But that, I imagine, is simply in the case of the first extracting of the plug when there is undoubtedly a considerable jet of water, but that would not be a continuous supply which would be useful in case of a fire; the pressure would fall off very shortly?—If you have a main which gives off 50 or 60 feet of jet, and you put three or four or five hydrants to work upon it, in a little time the pressure will be reduced by about one-fourth, but by shutting off the private supplies, and by concentrating the water from the distant reservoirs, a 100-feet pressure may in almost a minute of time be augmented under unity to 200 feet or more.

32. I suppose you might within a few minutes get additional pressure put on from the pumping stations too?—At one time, in Liverpool, when they wanted additional force at the pumping stations, they used to send a messenger on horseback; they have now, as I am informed, united the pumping station to the town by telegraph, and in a minute, the engines being ready, the jet would be elevated from the reservoir some miles distant.

33. Has your committee examined into this question of unity of action, and the effect it would have upon the existing pipes as laid down, to ascertain whether there would be any great alterations required in them?—To put a very old system like that in the metropolis under unity, you would require a detailed examination of the system, and at some points it may be expected the pipes might be found insufficient. For the purpose of protection the pipes are insufficient in some places in point of size; for instance, along the wharfside property they have only 3-inch mains, whilst a proper provision for fire would require a 9-inch main and a special pressure.

34. Under a united system would not there, in fact, be a better system of mains required throughout a great portion of the town?—No doubt; but in respect

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respect to extensions and alterations, it is of very great importance that the water supply should be under a public authority, that it may bring the public interest in respect not only of domestic supplies of water, but of fires. It was an observation of Mr. Bryson at Glasgow, that they had only at first regarded the domestic supplies and the ordinary supplies, and had not put down pipes of the size requisite for dealing with fire. For instance, they put down a 3-inch pipe where a 4-inch, with a little additional expense, might have been put.

35. This unity of action would necessitate the establishment of hydrants also, to get the result which you have at Manchester and other towns, would it not? —It would; I may add that foreign cities have now adopted them; Hamburg has had them in operation for a long time, and Paris is now establishing them, and bringing a hydrant to the door of every house.

36. I suppose you would qualify that statement to a small extent, would you not, because a hydrant within a given number of yards of a house is equally effective as if there were one to each house?—More so; in fact, generally; that is to say, as regards a hydrant inside an edifice. As a rule, appliances outside large buildings are of more value than they are inside; because with regard to inside appliances, you will see in some of our offices a fire protection upon every turn of the staircase, but if a fire takes place, the passages are filled with suffocating smoke or flame, and the appliances are inaccessible. You have more room to work outside a building. I was consulted not long ago with regard to the Inner Temple, and I advised the authorities to look to the outside for protection as much as the inside.

37. But you stated that in Paris and other places they were bringing a hydrant to the door of each house. I presume that meant that they were bringing a hydrant within accessible reach of the door of each house?—Yes; I should perhaps modify that answer in respect to Paris. I should call their tall houses perpendicular streets, so many families live in each stage or flat; they have a larger population in each street than we have.

38. To have, in fact, such a system in London as you have hinted at would entail an immense expense upon the ratepayers, would it not?—Not at all; by that arrangement of unity a large saving may be made. We obtained the information from some of the companies in my time, and also since, that by unity at least 100,000 *l.* per annum is to be saved in the administrative expenses alone, a sum which, if capitalised, would suffice for putting the houses in a condition to receive the constant supply, and to hydrant the mains in the streets, and also the hoses and apparatus, which generally cost more than the hydrants. But beyond this, by unity, also, and this constant supply, if we reduce the consumption to that in Manchester, which is 20 gallons per head, we shall reduce the cost of supply by one-third fully of the cost of works; that is to say, probably we might save all the New River Company's water, or all the Southwark and Vauxhall, or all the Chelsea Company's supply of water hydrants, and, more even than all that, the annual cost of their works, as well as of their administration. At present there are 110 million gallons of water every day pumped into the metropolis, and probably about only half of that is consumed. I have a recent illustration of that point. The people of Richmond determined to have a supply of their own, and a constant supply, and they laid themselves out for getting a supply at the rate of that which is given to the metropolis, viz., 33 gallons per head. I advised them to look carefully at the consumption then going on, which they did, and they were surprised to find that the waste of the water in the half of the town which they had gone over was more than one-half, probably two-thirds, of the total former supply. They will be enabled, by looking at the fittings, and taking care of them, as they do at Manchester and other places, to supply a double population from the same sources.

39. That is to say, that by turning their attention to the fittings and thereby preventing the waste of water, they would be enabled to reduce the consumption under a system of constant supply to the amount you have stated?—Quite so, but there is this further point upon that question of what a private company can do. If the Southwark and Vauxhall Company had gone round to examine the fittings or the cisterns of the private houses they supplied, they would have been told to go away, but if the water supply were placed upon a public footing the officers would be admitted for the purposes of examination, as they are at Manchester and other places, without any difficulty.

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40. That is to say, that where the municipal authority has charge of the water, they can make rules which the citizens do not object to, whereas they would, perhaps, object if they were made by the officers of private companies?—Yes; Captain Tyler has stated that he represented to the Chairman of the East London Water Company the expediency of their stopping this waste, by looking into it and providing the requisite fittings, but to this the chairman decidedly objected, stating that in the case of the better description of property, which he considered alone required consideration, ceaseless and ineffectual war between the company and the consumers must result if the directors were to have the proposed power thrust upon them. I have only heard of one case where a private company effected a reduction of the common waste. In all other instances it has been done by public authority.

41. And you say that at Richmond, which is the most recent experience, they have detected a waste of water which they are prepared to alter, and by which they will save considerably?—Very considerably, as I am informed.

42. That is in the way of reduction of one expense, but then there would be another cause of expense, namely, the laying down of these hydrants; it has been stated that the cost of applying such a system to London will be so excessive as to make it prejudicial rather than otherwise, and that therefore it is not done?—It is very easy to say dogmatically that the experience of other places like Manchester is not available for the metropolis, but it would be extremely difficult to prove it. The fact is, that gravitation does not differ so much in the two places, and a hydrant which does so much in Manchester under nearly double pressure, and with a saving of fully one-third of the water formerly supplied, would certainly do in London. I know an engineer who would be very glad to take a contract for the whole of the metropolis at something like 3 *l.* per hydrant.

43. Is that the engineer who laid down the hydrants at Manchester?—No, it happens to be my own son, an engineer who has completed a large system of new works at Odessa; they have laid down hydrants for the protection of that city.

44. It has been represented here by other witnesses that one of the causes of the expense of laying down hydrants in London was first the breaking up of the streets, and the cost of relaying the paving; and secondly, the length of pipe which it would be necesary to put to your hydrant; what do you say about that?—They take the highest as the general cost of the lowest. In putting down hydrants in the City of London you have to penetrate through so very hard a pavement, and there is so much difficulty in the way of obstruction in opening and closing (so says the City engineer); then they have to expend more there than they do in other places undoubtedly, but in the suburbs and all other open and unoccupied places, the hydrants could be laid down with less expense. Some addition must of course be made for the opening of the great streets. I do not know a more experienced man than Mr. Berrey, of Manchester, and he says that what they have done in Manchester in the change of system from the intermittent to the constant system, may undoubtedly be done in London, and at a slight additional variation of expense only.

45. You think that in his estimate, and in the estimate of the other engineer whom you had to consult, the large expense which has hitherto been an obstacle to laying down those hydrants in London ought not to exist?—Not to the extent of one-half of that which has been stated. Captain Shaw proposed a very good hydrant, I believe, which was talked of as being laid down at a cost of some 10 *l.*, and Mr. Swanton says he has a patent for it. But others at a lower cost appear to suffice.

46. I understand you to state that those which have been laid down in Manchester, and which cost very much less to lay down, are working very satisfactorily?—Perfectly satisfactorily. There is one objected to by Mr. Rawlinson, which has a ball-tap, which is one of several; but the statement as to that is, that it might have been badly supplied, for elsewhere where they are supplied, as at Odessa, and other places, if there is good workmanship, these ball-hydrants act sufficiently well.

47. I see on reference to Sir Joseph Bazalgette's evidence, that he stated that some of these hydrants were not fit to be put down in London on account of their liability to waste, and that you could not get at them without turning the general supply off?—With reference to the general liability to waste, the fact

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is that there is double pressure at Manchester, and with one-third at least saving of water. I submit that the evidence of water being saved is conclusive against water being wasted by them.

48. I suppose you have not considered the question of whether for the purpose of repairing them you have to turn off the whole supply?—No; you do not turn off the whole supply; we take the general practice of those who have had practice in London in the matter.

49. In fact, you would submit to the Committee that the cost of putting down these hydrants, which has been pointed out to be such an obstacle, is not one: and that the saving of expense in the consumption of water and economising the staff by unity of action, would not cast the burden upon the ratepayers which has been imagined?—On the contrary, we may give them an increased quantity of water by the constant supply, as against an intermittent supply, and we may give them an improved quality of water by a change of the system which makes bad supplies worse, and good supplies bad; and we also give them an increased protection or a reduction of insurance charges, in reality gratis.

50. You would get a system by which you would get better protection from fire, and yet at not a greater cost to the ratepayers?—At a less cost considerably, especially for improved supplies for the extension of the population in the metropolis, which is now going on at the rate of about 40,000 a year.

51. Mr. Swanton was of opinion that under a system of this sort, where you carry the appliance nearer and quicker to a fire, you would not require any very large increase of the fire stations and material which are at present in use in the metropolis?—The total number of calls for the fire brigade for the last year was 1,787, which gives an average of from four to five per diem. The total number of fires reported as serious was 161. This would give from three to four a week of serious fires; but on the system of hydrants in Manchester and Glasgow, the calls for the brigade force have been there reduced to some 4 per cent., which would give 63 in the year, or a little more than one call in a week to the brigade. Certainly not more than that. I may further exemplify this by the experience of Glasgow. Glasgow is going on increasing in population in a larger ratio than London is, but the brigade force there has remained quite stationary notwithstanding that; and really they have so little to do, that the chief brigade station is converted into a manufactory. Instead of the men being employed, or not doing anything except smoking their pipes and reading the newspapers, they are there employed as manufacturers of hydrants, hose, clothing, and other implements, and the men are paid extra. They are all mechanics, who are paid 5 *s.* or 6 *s.* a week extra for their extra service on occasional calls to attend fires with the machinery; but all the fittings of the hydrants, and the manufacture of the hose and other apparatus is now done by what we call the fire brigade force.

52. That starting as they did with a fire brigade force in connection with their police, they have, after adopting this system, so reduced the calls to fires and the work of the brigade, that they are occupied as you have stated?—I have seen them occupied as I have stated, and Mr. Bryson states that, "if London had the constant supply at high pressure, about one-half the present number of the brigade force would suffice. Glasgow has been increasing at an extent of 10,000 persons a year; but the brigade has not been increased. Under the old system, and such a system as that in London, Glasgow would have required a fourfold force, and yet would not have been so well protected."

53. That really implies, does it not, the advantage of connecting the brigade with the police force as it is there?—Yes, and altogether I may state that the advantage of the connection of the fire brigade with the police force will be in London that you will get the service of 4,000 police as firemen patrolling the streets in the night. The fire brigade, as at present and as proposed, has no patrolling force, and as I understand none is proposed.

54. The principal fires occurring at night?—Yes. Now it has been put as an objection to the proposed amalgamation that the police have at present enough to do. The apprehensions by the police are 70,000 in a year, but that amounts to eight and a decimal, or nine apprehensions to each man in a year, so that every man will only have about one case in six weeks. He may during that time have other services to perform, but none so important as those of fires or calamities; and further than that, it is to be observed that the chief

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services of the police in the way of apprehensions are during the day, or from six in the morning to about one o'clock at night, but the services for fires usually occur when the streets are empty, and they go on from midnight to morning, during which time the policeman, unless he has a stray burglar to deal with, has nothing to do. In the provincial cities mentioned, the police have more of penal service for more of criminal population than in the metropolis, and yet they find the fire service perfectly compatible with their ordinary duties.

55. Are you aware, also, of what was put before us by Captain Harris, that there are always a large number of police stationed at what are called standpoints in the town, and not on police beat duty, who would practically be available for such purposes?—Certainly. I may say that we have inquired somewhat with reference to the fire service now rendered by the police, which is certainly very considerably in advance, I should say, of the fire brigade. I think if this Committee were to give the signal they would find a jet would be available here in this building in about one minute or two minutes.

56. That is because the police have the appliances always at hand here?—Yes, that is the reason. Now in respect to speed and discipline, here is an experiment I have had made to test that. At Woolwich the police have the charge not only for the protection of the Arsenal, but they go out now and then to a fire in the immediate neighbourhood.

57. Are those police who are detailed in charge of Woolwich Arsenal?—They are detailed for all purposes of property protection; but they are specially trained for the fire service, and present conclusive evidence of what may be done generally with them.

58. Are they a distinct body of the metropolitan police detailed off for that duty?—Yes, they are told off specially; I have here a report from the superintendent in charge at Woolwich, in which he says, "The hydrants are scattered over the Arsenal, and placed in the vicinity of buildings, the shortest distance being two to every 10 feet, the greatest distance being 83 yards." He says, "Two men can run out a reel, and get it into play in less than two minutes; the police when at fire drill usually rig an engine, and can get water into play through four 40-feet lengths of hose on an average in one minute and a-half or one and three-quarters of a minute's time."

59. Are you aware whether in Woolwich the hydrant system exists?—Yes, in the Dockyards. Then the superintendent goes on to say, "On one occasion I sent a false alarm by telegram from Plumstead Gate to Main Gate, stating that the Carriage Square Sawmills (distant 700 yards from Main Gate) were on fire. The police off duty attended with five reels and the engine from Main Gate, and arrived as follows: First reel, five minutes, and ready; second reel, five and a-half minutes; third and fourth, six minutes; and the fifth reel and engine, seven minutes." That is as good work or even better work than in Manchester, where they get the engines from the police stations, or the additional force from the like distance, in about eight minutes. The time of bringing the brigade force to bear in London has been quickened since Mr. Braidwood's time, when it was some 20 minutes, to 15 minutes. Manchester brings it in some eight minutes, and this brigade force at Woolwich; it appears, gives it in some six minutes. It displays the large advance attainable, within his normal limit of security, of about two minutes or one-half immediately, and of extra assistance from a police station, probably close upon his time, some six minutes, as against fifteen minutes, the present brigade time.

60. The Committee have had evidence that in a part of the metropolitan area they have hydrants, and they have the police assisting in the extinguishing of fires, and with such results?—There was an example of a man before his time in one sub-district of London who did try a hydrant when he was in charge; he thought he could get the water quicker by attaching the hose to the plug than by sending for the engines; and he made it a practice to do so, and with great success in putting out fires, but it interfered with all the rewards of the engines, and he came to obloquy for his meddling and interference; he was condemned as an interfering fellow for it, and the practice was stopped.

61. But, however, you give that evidence in confirmation of what Captain Harris put before this Committee, that the police could very usefully supplement any fire brigade if it was attached to them, so far in extinguishing fires throughout the town?—Entirely so, on the provincial experience. There will be the gain in security of the service of 8,000 trained firemen, as against the existing force of

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of some 400. But beyond this, there would be a gain of popular moral force to the police which we have expatiated upon in our cited report as Constabulary Force Commissioners. We deemed it of primary importance that the police, wherever they could be, should be employed in beneficent duties; that their stations, when they are at the river side, should have appliances for saving life in the water, and especially that they should have the care of fire engines and other works. As far as that principle has been applied in the provincial cities, it has been productive of the best effect in conciliating the support of the population to the police. So far the principle has been applied in the metropolis, as in protecting people at the crossings of crowded thoroughfares, the care of life in various ways, and the care of lost children; and it was exemplified the other day at the river side when the river was bursting over at Lambeth. Instead of walking away, and thinking it was none of their business, the police went and knocked up the inhabitants, and were active in saving life, and preventing the extension of that calamity. Now all these matters of fire protection and life preservation we thought, and still think, are of more importance to the moral influence of the policeman than that of the mere thief catcher.

62. It is not at all foreign to the working of the police, because they do call to fires now?—They do, but they have not the appliances or the action on the occasion that they have in the provincial cities, that they ought, *a fortiori*, to have in the metropolis.

63. And you think it would be of importance to place the brigade in such relations to the police as that they could organize them for the purpose of bringing to bear these means upon a fire more quickly?—Quite so; the defect of separation is, that if you split a body of men into separate sections under separate commands, you beget a certainty of inaction or feeble concert, if not of repulsion between each. It is very much as if you were to put the artillery of the army under separate command, quite independently of the cavalry and infantry; it is just such a weakness in the administration to separate the fire service from the police service.

64. There is another point which I do not know whether you have considered, that is that by connecting the police and fire brigade together you would get greater telegraphic facilities for working the whole system?—Yes, that has been a good deal displayed in America; there they have got in each street a little apparatus in a small box or stand, of which the police constable has the key. When he detects a fire going on, he opens this door and puts in the word, "Telegraph to the fire station," and the word "serious;" and they have so arranged the stations that on the telegraph going the horses are liberated; and they are so drilled that they go to their stations at the engines and are hitched on, so that in 20 seconds, or half a minute, they start. Now with us it takes an uncertain time to convey the information to the station, by a foot messenger or a cab, and about three minutes at the station for a start.

65. With a combination in that way of the fire brigade, assisted by the police on duty, either at stand-points or on beats, and supplemented with good telegraph communication, you would be able in London to bring appliances to a fire as rapidly as you now do in small towns like Manchester and Liverpool?—Mr. Tozer, who has considered fire questions with great zeal (we sent him over to Constantinople on one occasion), and is full of enthusiasm in the matter; and he says that by the union of the brigade with the police, if the service were put upon the footing here upon which it has been put out there, you would have the finest preventive force in London of any metropolis or any other place in the world.

66. You have stated that for these purposes you require unity of action and therefore fusion as between the water companies, into the hands of one public body; would not some amalgamation of the companies themselves be equally satisfactory?—Amalgamation by the companies themselves has never that I am aware been proposed by them, and if attempted by them would scarcely be satisfactory to the public. All the successful combinations of service in the provinces have been on a public footing. There is a great deal of saving which might be made by unity, but it could not be done with complete satisfaction, because the great economy of water would be with the interior of the houses, and companies in general have been unable to attain that economy.

67. You have already stated that a public body can interfere with the in-

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habitants where a private company cannot?—Quite so; and then it is very difficult to get a private company which looks to dividend and profit only, to go into those collateral arrangements which must be done at the expense of the service and without regard to dividend.

68. Then, with regard to that proposal, it seems to imply a purchase of the companies generally by the local authority?—Yes, by a public authority.

69. That brings out a large financial question with regard to the metropolis as well as the hydrants?—We examined that financial question in my time, and examined it with communication from one or two of the companies. The late Sir William Clay was chairman of the Southwark and Vauxhall and the Grand Junction Companies, and the proposal was then to give the shareholders security for their then existing dividends; he thought they would be satisfied at that time with the existing dividends secured either on the consolidated funds for the metropolis or upon the local rates; this money could be raised at 3½ or 3¼ per cent. This public security, which cost the ratepayers nothing, would give to the shareholders the increased saleable value of the public security as against the security of the private company. You do not require to raise any money at all for the purchase-money. That proposition was resisted at the time by the shareholders, who said, This will give us an improvement upon our saleable value, but we do not want to sell, and we ought to have something more than that. There were various other obstructions at the time which prevented the accomplishment of the measure; but it was then agreed, and I believe it would now be agreed, that that was an eligible course. At Birmingham the authorities have recently bought the waterworks with money raised at 4 per cent.; it has been merely a change of proprietorship; then on the part of the shareholders, there are some of the companies which pay rather low. There was a question whether there might not be some division; there is part debenture stock and part share capital, and it was suggested that perhaps the shareholders might have some extra allowance, but that is a question which an impartial arbitrator would decide.

70. You see no difficulty in bringing about a unity of action under a public authority?—None whatever under competent and responsible officers with due authority.

71. With regard to that authority, do you recommend that the Metropolitan Board of Works should undertake this duty?—No, we examined that question. The first reason against it would be that the Metropolitan Board of Works have only the jurisdiction over rather better than one-half of the outer ring; some 100,000 houses or more are not under their jurisdiction. Besides that it has so large a work and so important a work to do, that without its being necessary to impute anything at all as to the constitution of the Metropolitan Board of Works, they may be assumed to be persons of the highest honour and respectability, yet they are people of other occupations and necessarily engaged in the exercise of other functions, and this is one work which, to be successfully carried out, ought to be carried out by an undivided and responsible attention; at all events, to get the machinery into working order, and when it is got into working order under such an attention, then it might be handed over to any other authority. Six years ago the unity of the water services as a means of security against fire from the insurance officers or the salvage corps was pressed upon the Metropolitan Board of Works, and nothing came of it; in fact the insurance companies pressed us at the Society of Arts to go into the subject to get public attention, because they had applied to the Metropolitan Board of Works and got no encouragement upon the subject.

72. Did I understand you to say that an application was made to the Metropolitan Board of Works?—A suggestion to them was made in 1871, I think by the insurance companies, immediately after the Chicago fire; in consequence of the alarm among the Insurance Companies, they pressed the Board of Works, as I understand, to consider the matter, and they represented to us at the Society of Arts that they could not make any way; that it was a thing not understood, not entered into; that that Board had no water staff competent to deal with the subject, and that it were well to draw public attention to it.

73. Who was it made that application?—The fire insurance companies. The gentleman who took the leading part in the matter was Mr. Reynolds, who gave us some evidence on the question.

74. You have stated the reasons why you think the Metropolitan Board of Works

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Works ought not to undertake this matter; what does your society suggest as the result of your investigation?—We suggested that large districts, where you could not get the work done by a particular locality, should be under a Water Trust similar to the Road Trusts which have been instituted, and that several engineers should be appointed to carry out the work. This principle has been adopted in Edinburgh, where the water supply extends beyond the municipal area. In other cases of municipal authorities, they have generally had it under their own management, but there they have put it under a special authority.

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75. You suggest a sort of trust for this undertaking?—Yes.

76. But would that trust not be subject to the same objection that the companies are at present, that the public would treat them solely as private companies, rather than as a public body?—No, on the contrary; there being absolutely no local authority competent to the task in the metropolis, our committee suggested the expediency or the necessity of creating a special commission or public trust for the purpose. To such a competent and responsible trust we considered the public would give the greater confidence manifestly due to it. We had the precedent of a Metropolitan Road Trust, which did a great deal of good in its time; they took up the roads of some 130 parishes, and they put them in a state of order, from which they have greatly relapsed since they have gone back to the parishes, but that was all taken into account, and a trust in union with the police was considered so essentially a public trust that the public would be quite aware of it; it would admit of supervision and attention, which the details of no private company would receive.

77. I have had put into my hands the Act of Parliament under which the Water Companies work, and I see by the 57th section of that Act that they have power under their statute to enter all the dwellings or premises for purposes of examination, or preventing waste or otherwise, therefore people could not refuse to let them in?—They could not; but that is a power which they really have not exercised, as proved by the waste, and I gave the reply which was given to Captain Tyler by the Chairman of the East London Company, when he was urged to exercise that power, that it would be a source of conflict they could not undertake.

78. Notwithstanding this clause, which says they may have power to enter and examine, if there be any waste or misuse of such water, and if at any time their surveyor is refused admittance, he may turn off the supply from the house and premises, they have not made use of that power?—That is a power which, at all events, as denoted by the enormous waste which is going on, is not exercised.

79. They do not like to exercise it, notwithstanding that they have the power?—The exercise of that power entails upon the tentant, probably, the bringing in a plumber, and indefinite expense; and also dispute between the temporary occupier and the owner, as to who is to pay for the alteration. The further reason for putting the water supply on a public footing, is with regard to the cost of conversion from the intermittent to the constant supply system, which may be done by a water trust or a public authority at a very low price. We inquired into that at several places, and especially at Manchester. Mr. Berrey stated the cost incurred there, under great difficulties, at 10 *s.* or 11 *s.* a house, and we considered that these repairs might be very fairly charged upon the public rates, and that that would be a great means towards public economy; and that there is not only the advantage in doing it that way, of relief to the occupier, but that there would be also an advantage in getting the public accustomed to an authority of this kind coming on to the premises and looking after the fittings, and seeing that they were put in order from time to time. That would be one particular advantage in getting it under public supervision, because, of course, the foundation of the economy derivable from change would be the security of the private fittings, and seeing that they were maintained in proper order.

80. Which you maintain a public body would do more effectively than a private company?—Quite so. With regard to what I stated about the change of supply, if we reduce the supply from about 110,000,000 gallons to about one-half, and had only that one-half to make provision for, we have good reason to believe that a change from a river supply to a spring supply could be effected

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within those economies. Now, on the lines that we laid down for the abandonment of the river supply, and taking up spring supplies, an improved water supply has been carried out in Paris.

81. You propose that this central authority, having charge of this water supply, should have the power of entering premises for the detection of waste; most of that waste would arise from imperfect fittings, at present, in a city like London; did your society consider, in its inquiry, what the effect of altering the whole system throughout such a town as London would be in the way of cost? —Our Committee considered that if it were done by a public authority, not by a plumber for every house; there would, perhaps, in a great proportion of the district be no need of anything but here and there a tap. In the lower districts, and in the poorer houses, the fittings are so very bad that here and there you might want a total change; but that has been considered as being within the large general average, and that it might be effected at the same rate as it has at Manchester; in fact, at Wolverhampton, and a number of other places where the change has been effected, the expense has been really found to be comparatively inconsiderable.

82. Are you able to speak with respect to what was about the cost of altering the fittings in Manchester?—It was stated to be 11 *s.* per house on the average.

83. Of course a very large portion, as you have said, of the metropolis is already provided with fittings which would be available under the new system? —I think that in a large proportion of the better class of houses they might very often dispense with their cisterns, and get a little money for them and gain some useful space. That would require very little alteration; it denotes the dangerous ignorance under which it is alleged that an entire change of internal fittings would be required for a constant supply, the fact being that under a constant supply the wear and tear of fittings is a great deal less than under a system of intermittent supply. The late Mr. Mylne, the engineer of the New River Company, formerly gave us some very important evidence, which it would be too long for me to recite, showing why he thought it would be a great advantage to water consumers if the private fittings were brought under that sort of supervision which I have indicated both to the occupier and owner of the premises and also to the water authority.

84. You think that there would be no likelihood of opposition on the ground of the interference which it would entail with the private houses of individuals? —None in reality has been experienced in towns where the system has been set up; on the contrary, in a little time the man comes and goes through your lower offices and sees to them, and you know nothing about it.

85. With regard to these alterations you have suggested, you are of opinion that by adopting them you would materially diminish the loss of life from fire and the damage done by fire in London?—Most certainly, going by the experience of Manchester and those other cities, the reduction of fire risks and the life risks by fire in the metropolis would be more than two-thirds.

86. And you would gain by a system of constant supply other advantages which are not within the purview of this Committee?—We should gain advantages even with respect to the improvement in quality, even if the sources were to continue the same, and gain enormous facilities for the application of any new sources, whether springs or otherwise. We believe that there are 60,000,000 gallons of spring sources which could be got very easily in substitution for the existing river sources, which you can never really sufficiently improve.

87. With regard to this body, which you propose should be set up for the purpose of supply in towns, objections have been taken very strongly, have they not, to any but a representative body being trusted with the supervision of such a work as that?—What we say is, that the metropolis, in respect to its local representation, is upon a distinct footing from all provincial cities. The metropolis must, to a great extent, be represented by their representatives, and, better still, by the Government, as in Washington it is made a provision that there shall be no municipal body at the seat of the Government; whatever administration they have there is in direct responsibility to the Senate and the Assembly. In foreign cities the same practice has grown up even under revolutionary and other governments. That which was analogous in Paris to our vestral system in London has been changed to unity; in the mairies in the provinces nothing but registration is left, and the whole of the authority given to an executive responsible

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responsible to the Government. The existing representative body is consultative and deliberative, but not executive; the executive authority is directly responsible to the Legislature.

88. Who would have the appointment of this trust which you have suggested?—I take it as in other cases the Home Secretary would make his appointment.

89. You do not seem to think that the functions of the Home Secretary are sufficient already?—If at one time that fear of responsibility had operated on Sir Robert Peel, we should never have had the change from the parochial to the metropolitan police; he was not frightened out of his life by the responsibilities he was said to be about to incur; but in point of fact, as to these apprehended troubles and responsibilities, when the system got to work, would entail no difficulty upon that score. In addition to that the Home Secretary would have the advantage of consulting engineers, some of them specialists on the subject, as to the choice of trustees, and he might ask the officers, as the Duke of Wellington used to do, to give a plan of a campaign, or suggest what they would do, and from those plans he made his choice, which was generally a right one. He acted as well as he could on the principle that the executive hands should belong to the devising head. We applied that principle humbly at the General Board of Health, with success in excluding patronage and in getting some distinguished appointments.

90. But surely the Metropolitan Board of Works have been entrusted with such powers at present, and have administered them well with regard to the metropolis?—I am not now called upon to do it, but I say that as regards the administration being good, I aver as a sanitary commissioner of the metropolis, that their drainage works have cost twice what they ought to have cost, and are yet very imperfect. We could have got a self-cleansing system of sewerage for the whole of the metropolis, and got the streets free from smells, within the price which has now been expended for two main outfalls.

91. Do you mean the Committee to infer that this public trust, in your opinion, would be able to acquire the interests which the companies have in these concerns, and to manage them for the ratepayers more cheaply and better than the Metropolitan Board of Works would?—Enormously better, as proveable by the execution of works on correct principle. Then as to time; they have had before them for six years this question of unity, and have done nothing with it. I take it that, supposing every sort of excellence on the part of these gentlemen, it will take them some time before they become sufficiently masters of the subject to be able to appoint with safety even the right men.

92. In your opinion a representative body are essentially more expensive in their working?—It is not my opinion, but a fact, that a representative body of this sort, take it in what branch of expenditure you will, at the very least would entail one-third more expenditure upon the metropolis than a public trust would, and I will justify that assertion if needs be by referring to the works done.

93. Now, turning for a moment to some other evidence that we had before the Committee last year, do you consider that it is any part of the duty of the fire insurance companies to make provision for extinguishing fires?—I think that, with the economies I have pointed out, there would be good reason for exempting them from that charge, more especially entailing as it does some right of interference with the functions of whatever authority there would be, but on principle, whenever we had anything to do in the way of such provision as those in question at the Board of Health, we have never thought of asking the fire insurance companies for anything in the way of contribution. They render exceedingly good service, for their own interests, in their salvage corps, which would act with greater effect in combination with the police and a public authority than they now do with the fire brigade.

94. Did you say you recommended that the fire brigade should be under the control of the police, instead of as it is, under the Metropolitan Board of Works?—Certainly; all the provincial officers who have special experience, without one exception, who are impartial in their opinion, that I have met with, have no doubt of the enormous advantage that would be gained to the public in that case.

95. Supposing it to be your opinion that the fire insurance companies give sufficient contribution by the salvage corps to the fire-extinguishing expenses,

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would you be of opinion that the proportion which they at present contribute should not be retained?—It should not be retained. I should mention in point of practice that on the change of system in Hamburg, where fires from incendiarism had been very rife, one of the effects of the application of the hose within two minutes after the breaking out of a fire, was frequently to interfere with trains laid down for incendiary purposes; and that quick application alone stopped a great amount of incendiary practice, which prevails very largely with insured buildings over the Continent. Then again, the police being admitted into the premises for the purposes of prevention, might conveniently accomplish one object which has been a good deal dwelt upon, as to inquiries into the distinct cause of the origin of fires; it would be far better, easier, and cheaper to put it in the hands of the police, and in case anything arose of a suspicious character, they would call in their superior officer and direct further investigation, and if needs be, prosecution.

96. It would be a better means of detecting incendiarism, you believe, than by the present system?—Enormously; it has been so found at Hamburg; it was found there that that was an important characteristic of the change of system.

97. I suppose at present in London, where there is generally a man on the spot, if he saw anything which led him to believe it was incendiarism, they would take action?—They would; but they have not that authority inside the house which they would have if the service of their brigade, so to speak, took them inside the premises; it is not the function of the fire brigade at present to do anything in the way of prosecuting, whereas it would be most eligibly the business of the police brigade to do so.

98. Have your society, or have you yourself, privately considered that part of the instruction to the Committee which has been added this year with regard to the protection of theatres from fire?—Our committee have been charged with an inquiry into that subject, believing at that time that it was a subject which would probably not be taken up by the Committee. We have consulted the police, and we have sent over and obtained experience from Paris and other places, and I think rather a complete collection of facts have been made and embodied in a Report which will be submitted to the Committee.

99. Are you prepared then, on the part of the society, to submit all the recommendations that you would make to the Committee in the form of a paper?—Yes.

100. Will you hand that paper in?—(*The same was handed in*, vide *Appendix*).

101. Are you aware that this history with regard to theatres was gone into by a previous Committee of the House of Commons?—I was not. We took the matter up at once, and had the evidence before us, and the persons consulted were the Salvage Corps, who gave us a great deal of information, and the police, and also people at Paris.

102. That paper shows all the information that you have received from foreign towns about the matter?—Yes; the most material paper is from Paris. We consider that the theatres present large exemplifications of the general principles elicited by the whole tenor of the general evidence on the advantages of the amalgamation and unity of forces in the metropolis.

103. Is there any other point which you would like to put before the Committee?—No; I think your examination has elicited all that immediately occurs to me as necessary to state at present.

104. Mr. *Locke*.] Are you aware as to whether or not any alteration has been made with regard to the theatres which have been lately built?—No; I understood that the Lord Chamberlain had sent round a circular recommending attention to be paid to openings, and attention also, amongst other things, to constructing all the stairs of stone. I think the evidence we obtained was that concrete was better than stone.

105. That is what you have been told about it?—Yes.

106. Are you aware that a rule for the construction of theatres was laid down clearly by the Committee in the year 1866, when the House of Commons went into the question of theatres?—I am not aware of that; we went at once to the present condition of things, without inquiry as to the past.

107. Are

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107. Are you aware that instead of theatres being built upon the ground, they have been built under it since?—I was not aware of that.

108. And are you aware that when they do catch fire they cannot be put out?—I am not aware of it. We got an account of their existing condition, but the most material point with respect to the existing theatres is the extremely wide difference in the insurance charges. The insurance companies examine very carefully into the matter, and we took their evidence of the difference of premium rising from 1 *l.* to 6 *l.*, as showing the variety of the dangers existing.

109. But you are not aware that a rule was laid down in that Committee on that occasion as to the mode in which the theatres were to be built?—I am not aware of that.

110. As I have stated, these theatres have not been remedied or built in accordance with the recommendation of that Committee since 1866, when that principle was laid down?—That is one of the grounds why an executive power should be given to the police, as in Paris, in order that they may see to the due execution of the law; otherwise your passing laws, assumed to be self-acting, will be of little avail.

111. The question was with reference to the mode of building theatres, not putting them under ground. Are you aware that some of the best theatres have all been put under ground?—I was not.

112. Take the Criterion; that is under ground altogether, is it not?—I am not acquainted with that theatre. We looked to the evidence of their existing condition, as obtained from the police chiefly who are in attendance upon them.

113. It does not appear that you have looked into any of the theatres; but have you been to America?—I have not.

114. Did I understand you to say that the mode in which the thing has been carried out in America is better than in England?—No; I daresay that in America they very much copy our faults; the information I have adverted to from America was derived from an officer of the police who examined the fire arrangements in Philadelphia with regard to saving time in getting water to bear.

115. Has that been the course in America; have they been careful in putting out fires in houses there?—Yes, they have, in Philadelphia at least.

116. Do you not read in the newspapers which come from America that the whole of a town is burnt to the ground frequently;—The American towns are built very largely of wood, such as for instance Philadelphia, and they are built in ways that they have not control over. Nevertheless, the fact is, according to American experience, if a great fire were to occur here as at Chicago, and got hold of a block of our tall warehouses or buildings, it would, during a hurricane, have a sweep of devastation that nobody can imagine to what extent—utterly beyond any possibility of dealing with.

117. What is the plan that they adopt in America; that the water should be brought up into the house to prevent its being burnt down?—I am speaking only of the examination of Philadelphia. I have the report of the inspector of the metropolitan police, which gives you that information.

118. You propose adopting in England that plan which they adopt in America?—In one respect.

119. Which is the one thing?—The arrangement for telegraphic communication to bring, when needed, a large force to bear with greater speed than we do here.

120. You do not expect to be pleased with the result in this country which they attain in America with regard to fires?—In America they have come to this: there is a book published recently by one who has had great experience in these fires, and the whole purport of it is to enforce the necessity of small means close at hand and quick application, as being in principle more effective than large distant means, however complete they may be; that you cannot rely upon them, and that they have not in America yet sufficiently relied upon those small means immediately available.

121. Then they are worse off there than we are here?—Yes, in some respects.

122. Is it one respect that there are more fires there than there are here?—There is a larger amount of wood buildings there; their local administration has been, according to their own accounts, very careless; more ignorant, irresponsible, and careless even than it has here, and their arrangements, according to

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their own account, are very defective, excepting in some cases where, from the extreme severity and frequency of fires, they have been roused to some exertion, and that exertion has led to the putting aside of the volunteer fire brigades and throwing more upon the police and getting these quicker electrical means of communication.

123. But considering the matter altogether, do not you think it would be more beneficial not to have anything to say at all with respect to the mode in which they manage these matters in America; is not the result there much worse than it is here?—I did not intend to go beyond that one point, namely, the electric communication. Their police is worse, their care is worse, and their buildings are more of wood, and there is a great deal more exposure. I believe that America will benefit by what you may do here, with the exception of their improved general telegraphic communication, by which we may benefit.

124. Are there not four theatres lately built which are all under ground?—I have rarely the time to go to theatres. I am not aware how that may be.

125. Mr. *Forsyth*.] You told the Committee that in your opinion the Fire Brigade should be under the control of the police?—It is not my opinion alone; it is the opinion of almost all the chief officers serving in the provincial cities, and the majority of those, at least, in the metropolis.

126. Would you take the fire brigade away entirely from the Metropolitan Board of Works?—Entirely, as being most unfitted for such a charge, and as but having only a tithe of the effective force requisite and available from the police.

127. When you say you would put them under the control of the police, would you have them part of the police?—I would have them part of the police.

128. Is it not the fact that for the purposes of extinguishing fires it requires rather a special training on the part of the men?—For great occasions, certainly.

129. But of course they must be prepared for great occasions?—They may, under a complete system, be prepared to blow up houses to stop conflagrations.

130. As you never know whether a fire will be great or small at first, the men must always be prepared for great occasions as well as small, must they not?—Yes.

131. Would you propose that what you call the fire brigade as part of the police should be a distinct part of the police, or would you have all of the men trained so as to be ready to take part as a portion of the fire brigade?—I would have all the men trained in degrees.

132. Would you have a certain portion of them specially selected for the duty, and the others so far trained as to be able to assist them, or would you have them all go through the same discipline and instruction with regard to fires?—The use of steam engines and the use of all these larger appliances would require a distinct management and training for it; but the use of the hose and a great deal of the smaller apparatus, all the immediate apparatus for acting under command, should be taught to all of them.

133. You would then have a certain body of the police who would be, so to speak, specially instructed in the more difficult requirements of the fire brigade?—Certainly; I believe it would be a very large relief to the men of the present brigade force to be amalgamated directly with the police force.

134. With respect to the cost of hydrants, you say you know an engineer who would contract to lay down hydrants throughout the metropolis at something like 3 *l.* a-piece?—Yes.

135. It is becoming rather the practice to pave the streets with wood, is it not?—Yes.

136. Have you taken that into account; would it not be more costly to lay them down where the streets are paved with wood?—I myself would be an advocate for asphalte; the asphalte openings are cheaper, but at all events that would be no great matter of difference.

137. But assuming I am right, and that there will be a very great increase of wooden pavement in the metropolis, would not that increase the cost of laying down hydrants in the metropolis?—I do not think it would; that has not been very specially looked at by those who have been consulted on the water question, but I have not heard the specialists state it as a difficulty occurring to them.

138. You

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138. You say that at Glasgow the fire brigade is so seldom called out owing to the use of hydrants and other appliances, that their buildings are used as a factory for the purpose of making hydrants and hose?—Hydrants, hose, and men's caps and accoutrements.

139. But I suppose when a fire takes place in Glasgow, notice is at once sent to the fire brigade stations, and they must be ready to go, and do go whether the fire is put out or not?—They drop their work and go immediately to the fire.

140. The fire may be put out before they get there, but still they go for the purpose of seeing whether their services are required or not?—Yes, but a small fire would be put out before they got there. It must be a serious fire, and then they go out with their engines.

141. But they cannot tell whether a fire will be a large fire or not until some little time after the fire has broken out?—Quite so.

142. Therefore they must be always ready to go to a fire when their attention is called to it?—They are ready.

143. And, I suppose, they are not only ready but actually go?—They actually go.

144. Therefore I do not exactly see the meaning of your remark that at Glasgow the fire brigade is very seldom called out?—In about 3 or 4 per cent. of cases only.

145. But surely if a fire takes place the brigade is called out whether the fire is serious or small; is not that so?—No; that is just the arrangement they have in America; they telegraph whether the fire is serious or not.

146. But how can they tell whether a fire is serious or not?—I suppose the policeman finds he can put it out with the hose alone, and it is put out in the large majority of cases, but if the fire is getting the mastery, or threatens to be serious, then the policeman telegraphs.

147. But surely as long as a fire is burning in a house you cannot tell how far it will spread until it is put out?—There are no calls upon the brigade unless the fires are serious. The calls upon the brigade are 4 per cent. of the fires.

148. Because they either see that the fire cannot extend, or the fire is put out before the fire brigade is wanted?—That is so.

149. I want to know this with regard to theatres; did your Society of Arts go into the question of the mode of escape from theatres in case of fire or panic in ancient times; say, in Rome?—No, not at Rome.

150. You know we have a good deal of knowledge upon that subject; you have heard of the Vomitoria?—Yes; I examined once a plan of the Coliseum, as restored, and the Vomitoria appeared to be exceedingly well arranged.

151. But the society did not go into the subject practically?—Our committee did not.

152. Do you know whether the premiums of insurance policies on theatres in London are higher than on houses?—A house premium would begin at about 1 *s.* 6 *d.* per cent., but on theatres there is nothing under 30 *s.*, and some are as high as 6 *l.* On cotton warehouses, such as the Watling-street warehouse, the premium would be about 10 *s.*

153. Then theatres are exceptionally high?—They are.

154. Mr. *Hardcastle.*] I think you stated that in Manchester the fire brigade was under the management of the police or connected with the police?—It is part of the police; I may almost say like the artillery force is part of the army.

155. That is not in accordance with the evidence of Mr. Berrey, who is the superintendent in Manchester. Mr. Berrey states, "Some remarks were made this afternoon with regard to making policemen into firemen; I entirely disagree with that, because I think the fire brigade is a service which ought to be kept to itself; and to show you how that opinion is acted upon in Manchester, the police authorities there do not allow their policemen to become firemen unless they are transferred?"—There is some mistake about that; all that I know is this; I have the evidence of Mr. Tozer upon that point as to what they do; they do as I state, namely, the police stop some 70 per cent of the cases.

156. Speaking of what they do, you must remember that Mr. Berrey is the Superintendent of the Manchester Corporation Waterworks, and here he states,

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"In Manchester the police keep order at a fire, and upon that account, seeing that they are in the charge of the same committee, if it were desirable that they should unite the two services they could easily do it, whereas they have not done it?"—I do not understand that evidence; they are under the police; that I know positively from Mr. Tozer, but that may relate to the mode in which the men in charge of the engines act instead of with regard to the small appliances, such as hydrants.

157. I think you will find that Mr. Tozer's evidence agrees with Mr. Berrey's; they both agree that the brigade are perfectly separate from the police, but are managed by the same committee of the Corporation?—That relates to the establishment having charge of the larger engines, the steam and the horse and the manual engines; they have hose-reels at each police-station, and each policeman has access to all the hydrants; he must be referring to that.

158. I was merely anxious to point out that it appeared to me that your evidence differed from Mr. Berrey's upon this particular point; then you state also that 70 per cent. of the fires were extinguished by the police in Manchester?—Yes, they are extinguished by the use of this pail and a small pump.

159. Would you refer to Mr. Tozer's evidence at Question 6774, page 515; he says that the total number of fires was 308, of which 20 were serious, and 288 were slight fires; he says that "at 40 fires the firemen and the police extinguished the fires with buckets of water; at 26 fires the police alone extinguished the fires without the assistance of the firemen;" consequently it appears that the police alone until the arrival of the fire brigade extinguished only 26 fires out of the 308?—That is very different from what he told me.

160. At 79 fires the owners of the premises extinguished them before the arrival of the police?—He gave me the fact very distinctly that 70 per cent. of fires were put out with that small implement, as I understood him, by the police.

161. Your evidence was in reference to the case as between the police and the fire brigade; and therefore I wish to show that the police have only put out, according to Mr. Tozer's evidence, a very small number, except when assisted by the regular firemen of the brigade, namely, 26 out of 308?—I have got it quite distinctly that 4 per cent. is the limit of the calls for the brigade, that is to say, the machinery of steam and horse engines.

162. I wish to ask you one more question. You made a statement which was rather startling, that up to 1866 the police in the metropolis kept fires in?—That is the evidence which I have got, that up to 1866 the police were paid for keeping the fires in.

163. By whom were they paid?—They were paid out of the fire brigade funds. I will give the Committee the notes of the evidence. This is the minute of Mr. Tozer's evidence: he was at that time secretary to Mr. Braidwood, and he knew the practice. "From 1863 to 1866 the police were rewarded for keeping a place shut up until the arrival of the brigade, regardless of the distance the brigade would have to be fetched; the reward being 20 *s.* Several hundred pounds per annum were paid in this way by the London Fire Brigade, and there was also a further reward of 10 *s.* for the constable who discovered a fire, regardless of whether he could have produced the fire himself or not; he was further rewarded for working the engines after their arrival, and was upon those occasions paid so much."

164. Was that money paid out of a private fund raised by the brigade or out of a public fund?—I merely repeat his statement as to how the police were paid. I think the parish paid some of the fees up to 1866.

165. Sir *James Hogg.*] Do you know what quantity of water is required to extinguish a large fire in London?—No.

166. You know Captain Shaw, do you not?—I do.

167. His evidence is worth something, I suppose?—I should think he is a very respectable officer.

168. Probably you would not mind taking it from me upon his evidence; in answer to Question 1415 he says, that it would take 2,000 gallons a minute:—I will accept that statement.

169. Could you tell me what pressure per square inch would be required to throw a jet of water through 200 feet of 2½-inch hose, with an inch nozzle, 50 feet high?—I cannot.

170. Perhaps you will take it from me; Sir Joseph Bazalgette says, in his evidence

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evidence in answer to Question 5599, that it is 55 lbs.?—I would rather take the evidence of a water engineer, or somebody conversant with the matter.

171. Take Mr. Bramwell?—I would not take Mr. Bramwell. I should prefer some water engineer like Mr. Quick.

172. Assuming that 55 is the poundage pressure, do you know whether the pressure given by the various companies is sufficient to throw a good jet?—It is generally a foot for every 2 lbs., I believe.

173. Do you know the pressure which the companies are bound to give?—I do not know that.

174. Are you aware that it has been proved in evidence before this Committee that the pressures given are generally insufficient for the purpose?—I have seen Sir Joseph Bazalgette's statement, but I have seen that utterly disputed by fire officers who have served in the metropolis.

175. I am referring to Questions 5582 and 5595, 5596 and 5597, and Mr. Bramwell's answer to No. 5822; do you know that the pressure is exhausted in driving water through a long length of pipe, and immensely so if the pipes are of a small size?—Very much so.

176. Could you give me any idea of the extent?—I have tables at home, but I have not any of them at hand.

177. Do you know to what extent the drawing off of water for domestic purposes will reduce the pressure?—There is a difference between the jets that are got in the day and the jets that are got at night, but I beg to repeat most emphatically that if the water were delivered only to the basement, it would be an enormous gain to have it led to the spot. I attach little importance to the talk about the different jets to be got in different parts. The experience of the fire brigade men is, however, that, in two-thirds of the places they have to go to, they find when they get a jet at all they get a respectable and sufficient one.

178. Is it not very often the case when the engines arrive at a fire that the water is not turned on, and that it is necessary to send for the turncock?—Certainly it is.

179. That being the case in London, could you tell me what would be the use of putting a quantity of hydrants upon pipes which are not constantly supplied?—I have been assuming all the way along that there should be a constant supply.

180. Then your evidence to-day has generally been upon the assumption of a different state of affairs from that which now exists in London?—Quite so, with reference to the mode of supply; that it must be essentially a constant supply.

181. You assume, or your evidence goes upon the assumption, that London should be supplied under one body with constant supply and high pressure?—I assume that London should be supplied with a constant supply at high pressure, and that the whole of the water supply of the metropolitan area should be under one system and one control.

182. Do you assume also that, under the present system of intermittent supply, hydrants would be of no use?—On the contrary, I think they would be of some use, though of very inferior use.

183. Do you think it would be right to spend say between 700,000 *l.* or 800,000 *l.* and 1,000,000 *l.* for the purpose of putting up hydrants in the metropolis before that state of things which you shadow forth comes to be in vogue in London?—I do, because even at the present time with an intermittent supply, it would as I say bring the supply by hose to the door, and bringing it to the door is an enormous gain. In Paris where their force of jet is rather low, at all events not so good as ours, they endeavour to get it to the door in every instance for the purpose.

184. You think we ought to spend about a million of money for the purpose of putting hydrants upon pipes which are not always charged?—I think the hydrants should be put down.

185. *Chairman.*] Your contention is that the million of money which it is stated would be necessary for the purpose, is very far in excess of what would be required?—Very far.

186. Sir *James Hogg.*] You spoke about their being put down at the price of 3*l.* a hydrant?—I did.

187. Did you mean the hydrant by itself?—Fixing the hydrants to the mains; that is the evidence of experts.

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188. Might I ask you the name of that expert to whom you are referring?—Mr. Berrey of Manchester for one.

189. Did Mr. Berrey of Manchester mention that he would be ready to supply and fix a hydrant for 3*l.*?—I think there was the same statement with regard to Glasgow; that the cost would be about 3*l.*

190. I think the City caused some advertisements about hydrants to be published last year?—I believe so.

191. Do you know what the last was?—I do not know that.

192. Do you know what the reply to these advertisements was?—I should expect from the way in which the thing was set about it would be a great deal more; beside that there are peculiar difficulties, as I have already stated, in the City owing to the pavement, and what they have to cut through, and what they have to remove, and the difficulty of fixing these things in thronged places during the day time.

193. I suppose what held good for the City proper would hold good for the extremities, would it not?—Far from it.

194. Will you explain that?—In the suburbs the openings would be done at comparatively little expense and little trouble, as compared to cutting through the pavement of the City, or working during a thronged traffic and under such inconvenience as would occur in the City.

195. Do you think if we take Temple Bar, where one side of it is in the City, the pavement is harder than it is upon the other side, where it is under the Metropolitan Board of Works?—I do not know anything at all about that; but those are points of detail. I must beg the Committee not to take them from me; I only get them second-hand, and may misstate them; you will get the information first-hand better from Mr. Quick. Mr. Quick gave general evidence to us; I forget what was his price, but it was greatly below the price stated to this Committee; he thought that about 80,000 hydrants would suffice, because you would place the hydrants according to the property to be protected; in some of the smaller streets and the lower districts, where you never have fires, and where it is a pity almost you do not, you would place the hydrants at longer intervals.

196. I see, in answer to Question 7033, Mr. Swanton says that he has an idea that the cost of a hydrant would be from 3*l.* to 4*l.*, in addition to the cost of breaking up the streets?—I know that plenty of contracts for hydrants were tendered for a less price than that.

197. You were referring to the service at Woolwich and at the House of Commons; is not that a special service of water?—I believe you have the water here is at high pressure.

198. Would you compare that with the rest of the metropolis?—It would be rather to the 630 miles of mains, which are now stated by the water examiner to be ready for constant supply. Those have been all ready for the hose.

199. You have stated something about the relations between the police and the fire brigade; that they have not hitherto worked in complete harmony?—I am aware from Captain Harris's evidence that they do not. He has given particular evidence that when the police have interfered there has been difficulty arising.

200. Did Captain Shaw give that evidence?—I do not know that Captain Shaw did. As a rule, whenever you put forces under distinct commands you will not have harmonious action, whatever pretence there may be. You will find that stated in the latter part of Captain Harris's evidence, and it is an exemplification of a common condition.

201. He mentions one single occasion?—But he gives that as an exemplification of the common and general condition.

202. Do you think he would know better than Captain Shaw and all the others?—I think upon that particular occasion he did know better than Captain Shaw and all the others.

203. Can you tell me of any other occasion when there has been an exhibition of jealousy. Captain Harris was asked in Question 7997, "So that your remarks with reference to jealousy refer to only one single part, namely, Woolwich;" and his reply was, "Yes; because in that one district only there exists a fire brigade unconnected with that under the Metropolitan Board of Works." So that he only gave one instance of jealousy, because there

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there was only one case of it?—I think when you put two bodies under special command, with separate and special functions, you are sure not to have harmonious action.

204. You could not give me any instance in the rest of the metropolis of your own knowledge?—I am not in the habit of attending fires, but I know that there is a feeling of separation, and there must be such a feeling when they are under separate commands and separate responsibilities; and even now I think I have seen some indication that there is not that harmonious action between the brigade force and the salvage corps than there would be if it were with the salvage force and the police force alone.

205. Can you give the Committee any instance of that?—The salvage corps are now complaining in their last report that they do not get the information which they ought to do; if you ask Mr. Swanton he will confirm that statement.

206. I understand you to think that the whole of the water companies ought to be under one head?—I think that the services ought all to be under one head, and that the water companies ought to be relieved of their present service.

207. In Manchester and Liverpool and Glasgow I think the municipal authority has the charge of the water?—It has.

208. Notwithstanding that you think that in London there should be a special commission appointed by the Home Secretary to undertake the duties which are undertaken in Manchester, Liverpool, and Glasgow by the municipal authorities?—Yes.

209. And you also think that the Home Secretary should be the person to select those individuals?—I think so.

210. Do you think that would be agreeable to the metropolis at large?—I think it would be particularly agreeable to the metropolis at large.

211. And conducive to their benefit?—Yes, and to economy and security.

212. You do not think the Metropolitan Board of Works should be the persons to undertake that duty?—I think that with their occupations they could not; that this matter requires an undivided occupation, and I am informed that the Chairman of the Metropolitan Board very recently before a Committee when something was proposed to be added to the functions of the Metropolitan Board of Works said that they were so occupied with commissions, and had so much work to do now, he rather objected to it.

213. Do you know the name of that chairman?—The honourable Baronet I have the honour to address said so, I am told.

214. I suppose you took that from hearsay too?—I have heard that.

215. Perhaps you will take it from me that I never said anything of the sort?—Whether it was said or not it is very evident to me that it is the fact from the inattention which they have given to a proposal of such importance from the insurance companies, and from the prolonged complaints of the condition of the supplies.

216. You stated that you could undertake to say that there was a proposition by, I understand you to say, the fire insurance companies to the Metropolitan Board of Works after the Chicago fire, that they should undertake to purchase all the water companies, and that the answer of the Board was unsatisfactory?—No, they did not make that proposal; it was that they should promote the unity of all the supplies.

217. I understood you to say that it was with regard to purchase?—No, it was simply limited to taking steps for promoting unity of the supplies.

218. Are you aware that the attention of the Metropolitan Board of Works has been directed to this water question for a great number of years?—Yes.

219. Are you aware also that the Metropolitan Board of Works visited Manchester and Liverpool for the purpose of gaining information?—Allow me to say, in answer to that question, that I am exceedingly surprised that in going down there they did not see some of the more important facts such as I state, the result of them being only 3 or 4 per cent. of the calls upon the brigade force, from adopting the Paris system.

220. Are you aware, when you say that the Board were not anxious for unity, that in 1871 the Government brought in a Bill to amend the Act of 1852, and make further provision for the due supply of water to the metropolis?—Yes.

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221. Are you aware that the Bill proposed to vest the jurisdiction over the water supply in the Board, with power to the Board to make regulations with regard to a constant supply if they saw fit, and to purchase the interest of the companies in the supply of water; that that Bill received the cordial support of the Board as a measure calculated to be very beneficial to the inhabitants of the metropolis; and are you aware that the Board were excessively disappointed when all the valuable provisions of the Bill were withdrawn by the Government?—I am aware of this, that that body was deemed so ineligible, that representations were made on the subject, and the Government were obliged to withdraw the Bill. Here are the words of Lord Aberdare: "I proposed to give to the Metropolitan Board of Works power to buy up the water companies, but the resistance to it was so great that I found it necessary to choose between its abandonment and the offer of a portion of it for the acceptance of the House."

222. But the Metropolitan Board of Works did everything they could to support that measure?—Lord Aberdare told me that he was desirous of conferring this power upon some local authority, but that upon going into the matter he found no local authority eligible, and, therefore, he left it where it is. He says: "I believe the Metropolitan Board has done its best, but that it has found its powers too small and the difficulties of the question too great to enable it to grapple with the subject satisfactorily." Lord Aberdare went on to say: "The area of the Metropolitan Board of Works would have to be greatly enlarged, for at present it does not cover the whole of what is called 'greater London,' nor those parts of London in which the greater part of the increase in the population is going on; London must some day extend itself into the outer circle, and we should have to create a large metropolitan body, and one that would possess every claim upon the public confidence." He presided at a meeting of the Social Science Association, where I was called upon to read a paper, and these are his observations upon the point.

223. You told the Committee just now that the cost of the alteration of the fittings in Manchester was 11 *s.* a house?—That was Mr. Berrey's statement.

224. Do you know Mr. Stephenson, the water engineer?—I do not know him.

225. You know him by reputation, do you not?—I do not.

226. Could you tell the Committee what was to be done in each house where the 11 *s.* was to be paid?—I apprehend that the Metropolitan Board of Works has been largely misled upon this question, upon the assumption that all the fittings in every house are to be altered, and that is the reason of the extreme cost that they propose, the fact being that very few of the houses, or none of any considerable extent, would have to be altered.

227. The Report which I hold in my hand, which takes a different view of the 11 *s.*, is based upon the Act of Parliament?—It is not based, I believe, upon actual practice as Mr. Merry's statement is.

228. I ask you; do you know what the 11 *s.* alludes to, or not?—In some of the houses they would find no alteration necessary at all. Here and there an additional tap had to be fitted on, costing 3 *s.*, another 10 *s.*, and so on, but that 11 *s.* was the mean expense of the entire alteration.

229. Mr. *Onslow.*] Who made this calculation?—It was not a matter of calculation, but it was a matter of statement of the expense actually incurred at Manchester, and incurred under greater difficulties than in the metropolis.

230. *Chairman.*] It would, perhaps, save trouble if I referred to Question 7462, in the evidence of Mr. Berrey, in which the question was, "Can you state what has been the charge to the consumers of this alteration of fittings?" and Mr. Berrey's answer was, "It did not exceed 10 *s.* or 11 *s.* per house"?—That is his statement.

231. Sir *James Hogg.*] You stated just now that the drainage of the metropolis cost double what it ought to have done; have you any idea of what the real cost is?—I know this, that if the metropolis had been drained at the same rate of expense that we drained a number of towns, it would have cost 3 *l.* 18 *s.* per house for main sewerage, and that would have given about one million and a-half for a self-cleansing main sewer; and you know this, that the main outfall sewers have cost 4,000,000 *l.*

232. Are you aware that the cost, including interest, maintenance, pumping, and

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and everything else, is only 1 *s.* per head per annum, and that the same thing in provincial towns is 2*s.*, and that in Paris it comes to very nearly 5 *s.* or 6 *s.* per head of the population?—There are old towns and others in which it has been more expensive, but this I am aware of, as being then at the Board of Health, and I know, from the testimony we obtained from Mr. Rawlinson and others, and upon the estimates which passed through the Board for works afterwards done, that the cost of self-cleansing sewers, if carried out on the same plan for the metropolis, would have been at the rate of 8 *l.* 18 *s.* per house.

233. Now, the practical result is, that it is 1 *s.* per head of the population of London, and 2 *s.* per head in the provincial towns, and 5 *s.* or 6 *s.* in Paris; so that London is drained very much more cheaply than other towns in England?—But in London, according to our recent examinations, there are now 250 miles of sewers under the Metropolitan Board of Works, which are cleansed by alternate flushings, which are 250 miles of deposit and extended cesspools.

234. Now, going to another point, you said that the water companies did not send inspectors to examine the fittings, and that if they did they were not well received?—I cannot say with reference to the general practice; I only give you the answer given to Captain Tyler, and the answer of Mr. Quick and of everybody else consulted.

235. That being the case, I am informed that the West Middlesex Water Company have six inspectors constantly engaged in inspecting the houses for the water fittings, and the Chelsea Water Company have two also exclusively employed in the same duty, and they find no difficulty; and the East London Company have 18 surveyors, whose duties include the inspection of water fittings, and who find no difficulty whatever; have you any information to give to the Committee on the subject?—I have this general information in relation to that particular matter, that there is that amount of waste; that there is now 33 gallons per head, on the average, throughout the metropolis, denoting immense waste, which shows, at all events, that the inspection must be with very little effect.

236. But anyhow you see inspection does take place?—With little effect as compared with what is done elsewhere.

237. You gave some evidence with regard to the fire brigade and the police at Manchester. I presume, after what Mr. Hardcastle said, you would like to correct yourself with regard to the police and the fire brigade being united, would you not?—It depends upon what you mean by being united; it may be under the control, and it is under the control of the Corporation committee. I received one of the reports the other day made by the superintendent of the fire brigade to the chief of the police, as it would be made by one officer to another.

238. Do you say the police are drilled in Manchester as firemen or not?—I cannot state the extent of the drill. I only know the evidence with regard to the practice that they apply the hose and put out the fires.

239. They are not specially drilled as firemen in Manchester?—They are not, I believe, all drilled to the use of the steam engine proper, which is the brigade function, nor to the management of the steam engine, nor to the management of the horse engine.

240. In fact the police assist very much as they do in London, do they not. Now you stated something about Glasgow; are you aware that the Glasgow Corporation have found that the present system of doing without engines is so insufficient that they have just given an order for two extra steam fire engines?—Very likely; it is possible from their large extension; but I know from evidence obtained only two or three months ago when I was at Glasgow, that the information which I have stated to the Committee was given by Mr. Bryson, the chief superintendent there.

241. But notwithstanding that they have high pressure at Glasgow, they are obliged to get extra engines?—Very likely; Glasgow is increasing at such a rate, especially with large manufactories, and large properties which may require these special appliances; but these special appliances are directed by the police.

242. Did I understand you to say that it would be a relief to the men of the fire brigade to be put under the police?—I believe it would be.

243. What special knowledge have you of the men of the fire brigade?—I have information that they are not pleased with their commands.

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244. That is second hand too, is it not?—That is second hand, of course.

245. Sir *Henry Peek.*] Of course we know your position at present; but may I ask you is your knowledge practical or theoretical, or both, on this subject?—If you mean by theoretical that I have had no service myself in the brigade, it is entirely theoretical; but it is also largely practical in this respect, as being a collection of the best information from practical officers; I do not adduce one bit of information from my own imagination. I get it from such practical sources as the salvage corps, the officers in charge at Manchester and elsewhere who have served in London, and such practical evidence as that of engineers who have laid down works, particularly at Hamburg and elsewhere. Moreover, our deductions when practically applied, as in provincial cities, have all been attended with success in proportion to the closeness of their application.

246. You do not of yourself know why Captain Shaw should so much have preferred sailors in the Metropolitan Fire Brigade?—That is a moot point about the qualities of the men. I think that I have heard some of the officers say, I cannot say it from my own knowledge, that they do prefer sailors, because a sailor is a handy man to go up a scaffolding or to get on to the top of a house; he has got, not his sea-legs, but something like them; he has got to go up heights.

247. Do you think that ordinary policemen could go up heights and sit upon walls, and play the hose in the same manner as sailors do?—I daresay the special corps, the brigade corps, would do, and do that.

248. Your idea still is that if the fire brigade were made part and parcel of the police, they would be as the rifle brigade many years ago used to be, a sort of selection of the force?—Quite so.

249. Then they would not be all trained, or anything like trained to the service, but only a section of them?—The whole of the police here in charge of buildings are drilled to some extent. Some others of them are drilled to another extent, merely to the charge of the engine. I think there is some evidence of the length of time it takes to train a private, and also the special force for the steam engine, and work of that description.

250. Changing the subject altogether, I wish to ask you about the supply of water. Did I understand you to say that if all the mains were interchangeably charged, that is to say, if the mains were all charged from the present high level reservoirs the town would have the advantage of being constantly on the highest pressure?—It might have, and then you could lay the highest pressure probably to any part. Of course, at one part you might get 400 feet pressure immediately; you do not want that; but Mr. Quick says you might generally add one-third more pressure to the whole force of the metropolis by unity.

251. That is to say, if the whole of the companies were amalgamated into one authority the present mains would give one-third more pressure than they do at present?—Yes.

252. Mr. *Onslow.*] Do you know what rewards in money are paid in Manchester for putting out fires?—It has been stated to me that they are from the police fund, and for protecting life from the Humane Society.

253. And not out of the rates?—I believe it comes out of the rates; out of the same fund as the police fund comes from.

254. Do you know on what scale the police are paid for putting out fires?—That, I am told, varies according to circumstances.

255. Will you kindly give the highest and the lowest rate of reward?—I cannot; they are rather reticent about the giving of their rewards, particularly in Manchester, where the general rule is never to give any rewards, private or public, for stopping a fire which the informant might possibly have occasioned himself.

256. You are not aware whether the reward is paid to the police-firemen only, or to the whole body?—It is paid to the single policeman who stops the fire. Any constable who stops meritoriously a fire before the fire brigade come up, if he effects what they call a "good stop," receives a reward.

257. Do you know as a fact that many fires are put out in Manchester by a single policeman without any assistance?—I take it that 70 per cent. of the small ones which are extinguished with the appliances stated must be done by the police.

258. But

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258. But you refer to a single policeman?—I also refer to single policemen, or to the policemen on the spot.

259. Are you aware that Captain Shaw is against giving rewards to policemen in London for putting out fires?—I am not aware of that.

260. Do you know who pays in Paris for the hydrants which are laid down at the door of every house?—I do not.

261. Do you know what class of hydrants they use there?—I do not.

262. Do you know how the principal amount of waste of water in the London houses is caused?—It is described as caused generally by stiff ball-cocks or taps loose, and on the days of the intermittent supply letting them run *ad libitum*. We made gaugings of the running of water on the days when the water was on and the dry days when it was off, and from those gaugings we ascertained that the waste was fully three-fifths of the quantity of the water then pumped into London, and I believe the proportions have since rather increased than otherwise; in various places they have been paying attention to that subject recently. There was an instance in which it was certainly done by a company, and the only instance I have heard of; it was at Norwich. The consumption was running at the rate of 40 gallons per head per day, and they cut it down to 14 gallons; and at Liverpool, where the supply has been 30 or 40 gallons per head per day, they have got it down to 17 or 15 gallons, but at Manchester if they get it down to 20 gallons per head a day, they have so much larger a proportion of manufacturers and other consumers that that would be probably equal to 15 gallons or 16 gallons in London.

263. Can you state, from your own practical knowledge, that nearly the whole of this wastage might be saved by the system of constant supply?—By constant supply, under the conditions I have stated, being put under a public authority. In Manchester they effected the reduction mainly by a house-to-house visitation. In Liverpool they have effected it, or are effecting it, by metering the districts.

264. Have you ever calculated what, in your opinion, an efficient fire brigade ought to cost in London if there were a constant supply of water?—I have not calculated the cost, but I certainly am strongly of opinion offhand that with additional services and a reduced body of men it might cost much less, and ought not to cost more than it does now.

265. Have you ever made a calculation of what the buying up of all the water companies would cost?—I cannot state it as a lump sum, but there is a great mistake made about it; it is assumed that a mass of money would have to be raised for the purpose, whereas it would be merely an alteration of the financial condition, substituting a public for a private security for whatever the payment was.

266. You think that no money need pass at all?—Not one halfpenny.

267. Did you ever make a calculation what the average percentage paid by all the London water companies is?—I do not know what it is now. I think three or four years ago it was 7 per cent. all round.

268. Did that include the New River Company?—I am not sure that that company was brought in. The New River is mixed up with some real property accounts. At all events, it was 7 per cent. all round.

269. If the New River Company was not brought in, it would make a material difference, would it not?—I think the New River Company has about one-fifth of the supply of water, and would pay something like 10 per cent., I think.

270. Upon what basis was this 7 per cent. calculation made; was it made upon all the water companies, irrespective of the New River Company?—I think so; it is the dividend all round. I think the highest dividend was 8½ per cent.

271. Is it your opinion that before you could have a thoroughly efficient fire brigade in London, all the water companies should be amalgamated?—I do not think the amalgamation of the water companies would effect that in any other way than by giving them a more efficient instrument to use, but there might be a more efficient fire brigade, or great increase of the efficiency of the fire brigade by amalgamation, immediate and simple. There is one point upon the question of economy which I omitted to mention, namely, the enormous economy of washing the streets by jet, as they do in Paris and several other places.

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272. Is it merely your opinion that the water companies do not, under the powers given by the Act, enter private houses to see that there is no waste of water, or do you state it as a fact that they do not?—It would be a difficult thing to state what all the companies do, but my opinion is this, that they do not do it from the enormous waste that is going on; a waste of some three-fifths of the total supply; that settles the question at once; you have only to examine the waste, as we examined the waste from the Board of Health, to see what the value of the supervision is.

273. Then you would propose that under the authority which you have mentioned when all the water companies are amalgamated, representatives from the water companies should be allowed to enter any house at any time to see that there was no wastage?—That a public officer specially charged with the duty of looking after the fittings should go at any convenient time and at convenient intervals to see whether there was any waste. The method in Liverpool to ascertain whether there is any waste is this: they do not trouble the houses unless there is a waste manifest in a district, and then they make a search into where that waste is probably occurring, and they have a sort of stethescope by which they can ascertain at night whether a pipe is running with water, and then they go into the particular house where they detect that waste by external means; that is a means of avoiding a great deal of unnecessary supervision.

274. Do you know Glasgow well?—I cannot say well, I have been there several times, and resided there, and I know something about the administration of the city.

275. Is it the fact that most of the large buildings in Glasgow are of stone or iron?—I think the greater portion of the large buildings in Scotland generally are of stone.

276. And of iron?—I cannot say that. With regard to manufactories, probably they would be.

277. Probably, therefore, there would be a less amount of fires in Glasgow than in London?—It has a great variety of manufactories, like Liverpool, and other places; it is somewhat of a seaport town, to which stores of an inflammable nature go, and it is put down as what is called rather a "fiery" town; it is an enormous entrepôt of all sorts of merchandise and manufactures, and a great deal of inflammable products are exposed.

278. Have you anything in this paper, which has been presented to the Committee, on which you wish to be cross-examined?—If on reading it there is anything else which the Committee should think of importance, I am at their command, but I think that exhausts all the information we got as to the theatres. We could not go into the antecedents and see what had been attempted before, our immediate object of research being the state of insurance and the state of supervision.

279. With regard to a question put to you by the honourable Member for Marylebone, as to putting out fires, I suppose that the police become accustomed to see at first sight whether a fire is likely to be serious or not?—I think they would get some sort of practice about it; at all events there is the fact of their efficiency in those cities that I have mentioned. I do not know any one instance abroad where the fire service is separated completely from the direct control of the body having the control of the police.

280. Do you know, as a fact, from your own knowledge, whether all the water companies in London have acted in respect of pressure up to their different Acts of Parliament, under which they were constituted?—I cannot say that.

281. It is your distinct opinion that, supposing the water companies were to be amalgamated, they should not be put under the Metropolitan Board of Works?—My distinct opinion is, that they should be put under a special body for a time. There is a distinction to be made as compared with a new piece of work and an existing one; when it has got into action, it may be put under the command of a local body. When the metropolitan water services were got into unity, working as one machine, it might probably be handed over without difficulty to a local body to supervise its administration.

282. Sir *Henry Peek*.] When you stated that the police were paid to keep the fires in, or to use another expression, to keep the houses shut up until the arrival of the firemen, which body give the rewards in that case?—I will repeat the evidence which I have obtained from Mr. Tozer of Manchester, who was then

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then in London. "From 1863 to 1866 the police were rewarded for keeping a place shut up until the arrival of the fire brigade, regardless of the distance which the brigade would have to be fetched, the reward being 20 *s.*, and several hundred pounds per annum were paid in this way by the London Fire Brigade."

283. You did not intend to say that the fire insurance companies ever paid anything?—Not at all.

284. Mr. *Ritchie*.] You made an observation recently about the desirability of having this constant pressure, in order to have a jet to wash the streets with; would it, or would it not, be a costly operation to have this washing going into the drains?—It would be a very economical operation; it would save cartage; that opinion is founded upon evidence both from Manchester and the City of London. Mr. Heywood made a trial of the street washing 10 years ago by hydrants, and paid particular attention to the matter that went into the sewers, and being carried down into the sewers in a "creamy" state, as it was called; it is immediately removed, and removed less expensively, especially when you have an immense quantity; by the sewer than by anything else; and another thing is that the matter which you get in the street is principally manurial matter, dung; there are 1,000 loads of dung deposited in the streets of London every day, and about 100 loads deposited in the City of London daily.

285. If you wished to preserve that, you would require a separate set of drains for that purpose, would you not?—Instead of throwing the sewage into the sea, which the Metropolitan Board of Works have done, but which Paris is going to throw upon the land, that would be an addition to the manurial matter which at present, being diluted as it is with the upland water, which should not go in—is very inferior.

286. If the plan were adopted of saving this matter, it would require an entire alteration of the arrangements of the sewage from that which already exists, would it not?—Not at all.

287. Is not all that which goes into the sewers at the present pumped up and sent into the sea?—But this will carry away a little extra amount of solid matter, and that would be no detriment either to the local sewage or the general sewage if properly treated.

288. It would have to be pumped into the river?—Some of it.

289. That would entail some expense, would it not?—Very little; the quantity of water wanted for the street cleansing of the metropolis would be about one-tenth of that which is now wasted. Here are about 60,000,000 of gallons pumped into the metropolis in excess, in injurious waste, which have afterwards to be pumped out again.

290. I think you stated that the losses by fire had been reduced to one-third in Manchester, and in Liverpool still more; was that by or to one-third?—The statement I have received is that the Liverpool fire risks were tremendous at one time, and that they are reduced to a fourth of what they were.

291. That is reduced by three-fourths?—Yes.

292. Do you know whether the premiums have also been reduced?—No, it is now found not to affect premiums so much; at least, in point of practice, the insurance offices have not altered their premiums; I believe, however, in Manchester they have not augmented them as they would have had to do, and as they were doing very largely in Liverpool. I believe in Liverpool the fire insurance offices have reduced the premiums.

293. I believe there was one question asked you by the honourable Baronet, the Chairman of the Metropolitan Board of Works, which you hardly comprehended; you said that the whole of your evidence about the water was based upon a state of things which did not exist in London; you spoke of its being necessary to have a constant supply, which constant supply did not exist at present?—To a very limited extent it may exist; say about 260 miles of main are ready for it.

294. But over a portion of the metropolis the circumstances do exist which would render it desirable to put down hydrants?—They do.

295. There is a difference, is there not, between high pressure and constant pressure?—Yes.

296. Do I understand you that with regard to the portion of the metropolitan area you speak of, when you speak about constant pressure, you mean high pressure?—No; constant pressure may be a constant low pressure, or a constant

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stant pressure a high one, according to circumstances; in either case a constant low pressure is an advantage, but a constant high pressure is a greater advantage.

297. Would you advocate putting on hydrants where there is simply constant low pressure?—I would.

298. Is it a very desirable thing in addition to having the pressure, to be able to get at the water readily?—Yes, if it is only to lead it to the door by the hose for immediate application, it is a great advantage.

299. We were speaking about the cost of these hydrants, and the Honourable Baronet spoke of it as being 800,000 *l.* or 1,000,000 *l.*; I wish to refer you to an answer by Sir Joseph Bazalgette, Number 5727, with regard to the cost of hydrants. You spoke of hydrants being about 3 *l.* each, all round?—Yes; probably in some instances they might be 3 *l.* or 4 *l.* each, and in others 2 *l.*, and in others 1 *l.*

300. Do you know what arrangement the Committee have made with regard to the number of hydrants to be put down?—No; I think they have made the distance between them something near 50 yards.

301. In your opinion would that be adequate for the purpose all over the metropolis?—If the hydrants were put, on an average, at every 50 yards all over the metropolis, that would be adequate. In some districts they would be rather wide, that is to say in the inferior districts, where there is no danger, but in others, near theatres and near warehouses, I would put the hydrants very close together. I believe in Manchester they put a hydrant about every 23 yards near very valuable property.

302. But taking the whole of London, you think that if it were protected by hydrants, at a distance of 50 yards on the average, the metropolis would be well and fully protected?—Thoroughly.

303. We have, at Question 5728, "But if the hydrants were also placed at the same distance as they are going to be placed in the City, the expense would only be a quarter of a million?" To which the reply is, "Yes, because you would only have half the number;" so that you think that if the hydrants could be put down all over the metropolis at the same distance that they are put down in the City, and if that could be done for a quarter of a million of money, it would be well to do it?—There would be great economy for insurance and life risks, and also, I must say, for the business of street cleansing it would be an economy of nearly half.

304. But that is taking the existing state of things into account?—Yes; that is taking the existing state of things into account.

305. I suppose you think it desirable, in the interest of putting out fires, that the water should be under the same control as the brigade?—Exactly.

306. I think you are not favourable to the Metropolitan Board of Works being the authority for having charge of the water?—For the reasons which Lord Aberdare stated, and why he withdrew the Bill, and for other urgent reasons.

307. But suppose this Committee recommed that the putting out of fires be still retained by the Metropolitan Board of Works, would that alter your opinion then as to the desirability of the Board of Works also having control of the water?—I think that would be very awkward, and a one-sided and imperfect arrangement, but still it would be some advance.

308. Your opinion would be that if the putting out of fires is still retained by the Metropolitan Board of Works, and the water is to be placed in the hands of any one body, that body should also be the Metropolitan Board of Works?—Yes, quite so; but it would be a very defective, ill-working, and wasteful arrangement.

309. Now you spoke about the water companies as persons having as their chief aim to look after their dividends?—Of course.

310. How do you reconcile that with the fact of their not looking after the waste?—Because there would be some of that due to mismanagement on their part, but there would be also some part of it due to the difficulty I have stated, of getting that superintendence over the fittings which there ought to be.

311. But we have an Act of Parliament which shows clearly that they have the control, if they choose to exercise it; and seeing that their chief object is to pay their shareholders a good dividend, is it not an extraordinary thing that they do not exercise that power to stop that which you say is going on, which

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is an enormous waste?—Yes, it is a waste to them chiefly of pumping power. The cost of pumping they do not reckon as pressing very heavily upon them.

312. But I understood you to say that the great cause of the waste was in consequence of the imperfect nature of the fittings, and that if the water were placed under a public body, they would be better able to control those fittings. Now, my argument in reference to that is, that a company whose aim and object it is to make the most out of the materials for their shareholders, are more likely to take steps for preventing waste than any public body would be; is not that so?—The plain fact is that, having these powers, they have not exercised them, and the proof of that is there is enormous waste going on. What their motives are is more than I can say, but there is that large plain fact, that of the water pumped into the metropolis, probably more than one-third is a mischievous waste, adding to the supersaturation of the soil with sewer-tainted water.

313. You think that that could be altogether stopped by taking it from the companies whose interest it is to make the most of their articles, and giving it to a public body who would have no interest of that kind?—Yes, for reasons which I have stated and the precedents I have adduced.

314. Sir *James Hogg*.] You stated that you considered it would be conducive to economy to use jets for the purpose of cleansing the streets?—I did.

315. May I ask you upon what you base that opinion of yours?—I base that opinion upon some experiments and workings which we conducted by an officer, who is at present an officer of the Metropolitan Board of Works, Mr. Lovick, who went into the matter very thoroughly and very satisfactorily, I think. I can hand in his report upon that subject showing the economy. We also had it tried by a different form of jet by one of our inspectors in Sheffield.

316. Do you know what it costs per cubic yard to cart away the mud in London?—I do not know.

317. Do you know what it would cost to remove a cubic yard of stuff out of the sewers?—I know it would cost a good deal less. The great difficulty is the cartage of the stuff. Sir Joseph Whitworth had a street-sweeping machine which did the work with one man and a horse of 20 sweepers; but he did not get permission by an error to remove the liquid matter and put it into the sewers, and the expense of cartage was so great that it really interfered and almost prevented the use of that machine.

318. You do not know how much it costs to cart away a cubic yard of mud, and how much it would cost to get it out of the sewers; would you take it from me that it costs 2 *s.* 6 *d.* per cubic yard to remove the mud off the streets, and that that same cubic yard would cost the metropolis a guinea to get out of the sewers; do you think that that would be an economical arrangement for the ratepayers of the metropolis?—There must be some extraordinary mistake about that statement as to its costing a guinea to pump up a ton of mud at Abbey Mills. The service of a Cornish engine was twenty years ago a shilling for raising 85,000 gallons 100 feet high, and is much cheaper now, and under what administration it must be to make it a guinea is a matter the ratepayers should look to.

319. Mr. *Forsyth*.] With reference to the last question put to you by the honourable Member for the Tower Hamlets, he contrasted the fact of a company whose interest it was to give the shareholders the greatest possible dividend, and whose interest it would be to prevent waste of water, with a public company who would have no such interest; but I apprehend that a public company would be under the control of Parliament, and enabled to levy a rate. Would not the public body have the same inducement as a private company would have to relieve the ratepayers of the rate?—Quite so, for a public trust would be under more stringent responsibility. All these cases have been considered more or less provincially, but particularly the economies of water; they have greater economies under the public service than private companies have been able to get.

320. Mr. *Locke*.] Will you allow me to call your attention to this Report of the Select Committee appointed to inquire into the working of the Act of Parliament for licensing and regulating theatres and places of public entertainment in Great Britain, and to report any alterations which may appear desirable: "they have considered the matter to them referred, and have come to the following resolution, which they have agreed to report to the House." I will call your attention to paragraph No. 5: "That it is desirable that any Act of Parliament dealing with the licensing

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Mr. *E. Chadwick*, C.B.

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of theatres, music halls, and other places of entertainment, should render compulsorily the inspection and survey of such premises as regards the stability of structure, due security against fire, ventilation, and the facility of ingress and egress, and that the authority to whom the licensing may be entrusted be required to frame regulations from time to time for ensuring the safety and accommodation of the public, which regulation should receive the sanction of the Secretary of State, and be laid upon the Table of the House of Commons;" are you aware that anything has been done in consequence of that recommendation that these things should be done?—I am only aware that they are in a state in which they ought not to have been if that recommendation had been carried out. That is a case where you want an executive authority, and a responsible authority to do it. If you put it on the police they would have been responsible, and that would have been done. As a piece of administrative work I would particularly refer the regulations in Paris to the Committee. The difficulty here is that the Lord Chamberlain may issue very good regulations, but I apprehend has no sufficient executive to see that they are duly carried out.

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Thursday, 22nd March 1877.

MEMBERS PRESENT:

Mr. Clifton.
Mr. Forsyth.
Mr. Hankey.
Mr. Hardcastle.
Mr. John Stewart Hardy.
Mr. Hayter.
Sir James M'Garel Hogg.
Mr. Kinnaird.
Sir Andrew Lusk.
Mr. M'Lagan.
Mr. Onslow.
Sir Henry Peek.
Sir Henry Selwin-Ibbetson.

SIR HENRY SELWIN-IBBETSON, BART, IN THE CHAIR.

Colonel *James Fraser*, C.B., called in; and Examined.

Colonel *Fraser*, C.B. 22 March 1877.

321. *Chairman.*] You are Chief Commissioner of Police in the City of London, are you not?—I am.

322. And as such you have, I suppose, had opportunities of noticing the way in which the present system of protection against fire works?—Yes, to a great extent.

323. As I understand, the Metropolitan Fire Brigade acts over the City as well as over the rest of the metropolitan area?—It does.

324. It is one and the same brigade for both districts?—Precisely.

325. From your experience are, you able to speak of the protection afforded to the City under the existing system?—Yes, I can to a considerable extent, I think. I perhaps had better describe to the Committee what is done at the first breaking out of a fire. The constable upon the beat on noticing a fire (and I may mention that I think in the majority of cases fires in the City are first observed by the police) springs his rattle, and our beats being small this at once brings three or four men to his assistance.

326. Will you state to the Committee what is about the length of your beats?—The average beats at night will occupy a man 10 or 12 minutes walking round them. Of course a man on one beat crosses another constantly, and meets him, so that the time might be reduced to one-half for the purpose of going to assist at fires. Then as soon as these men collect the first duty of the constable is to alarm the inmates of the house, supposing the house to be occupied, which is frequently not the case in the City. The next duty is to send one man for the fire-escape, another for a turncock, and then to give notice to the Fire Brigade Office, the head office being in Watling-street, in the very heart of the City.

327. How does he communicate with all those; does he send other people to communicate, or does he go at once to them himself?—He would send one of the policemen who would answer to the sound of his rattle, or a bystander if one happened to pass more quickly; but the distances are so short in the City to the fire brigade stations, that under any circumstances it is easy at once to communicate with one or other of them.

328. And what time does it take in general to bring the brigade to bear upon a fire after this warning?—Very few minutes usually; but it is not at all an unfrequent occurrence when fires break out that they are actually extinguished by the police before the arrival of the brigade.

329. That leads me to ask what duty the policemen do on receiving notice. Is there any appliance at hand that they can use upon a fire?—No, none specially; but they use the first buckets of water that came to hand, and endeavour to extinguish the fire; that is frequently done. The night before last a fire broke out, and was extinguished in that way; and I may say

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that one of the great difficulties in the City, as it is elsewhere, is getting at the turncocks; they are not very easily found sometimes. Only last week, when a fire broke out at the Polish Synagogue, the police went to four different turncocks before they could get one to turn the water on.

330. Of course the police have not any practical acquaintance with the condition of the supply?—No, nor can they turn on the water. Even the brigade themselves are not well acquainted, I believe, with all the different mains, and it sometimes happens that they are obliged to wait until the turncock arrives before they can get at the water.

331. Do you find that there has been any great want of water or difficulty in getting water at fires in the City?—I think not, practically.

332. The difficulty of getting water arises in many cases, does it not, from the absence of the turncock?—It has almost entirely arisen from the absence of the turncock.

333. Does that often happen?—I cannot say that it happens very frequently, because it is only the instances in which there has been any delay or any material delay which are reported to me. I might add, perhaps, that I am informed that, owing to the immense height of some of the buildings in the City, the fire engines now are not sufficiently strong to send water to the top of them. In a large fire which occurred not very long ago at Brook's Wharf, the fire engines could only send the water up to the fifth storey, whereas this was a building of seven storeys.

334. Were those steam fire-engines?—They were steam fire-engines working from the river.

335. In fact, your experience of great fires at present seems to be that you have difficulty in getting at the turncock, and that your men have no knowledge of the way in which the supply is worked, and that even when the water is to be had, owing to the height of some of the buildings, the power of the engines is at present hardly sufficient to send it to the top of them?—The height of the buildings in the City is increasing daily. As fast as one house is pulled down they build up another in its place very much higher.

336. Then is that a state of things which could be obviated by an improved water supply, or an improved means in the hands of the police?—I think it could be by means of hydrants, if those hydrants were connected with the mains. It is the intention of the Commissioners of Sewers to place something like 1,000 hydrants in the City as soon as they possibly can, and those hydrants will throw a stream of water to a height of between 70 and 80 feet, which is quite as high as most of the buildings in the City. It is calculated that a building of seven storeys is about 70 feet high, allowing 10 feet to each storey, so that in that case the hydrants would throw a stream of water at once to the top of the highest buildings.

337. I suppose that would be under the conditions of having a constant supply at high pressure?—Yes, undoubtedly.

338. I understand that you are making a change in the City in that direction?—Yes; it is partly done now, and it is intended to complete it. It is proposed eventually to place hydrants throughout the City to the number of from 960 to 1,000, and experiments have already been made with pattern hydrants by which a column of water has been raised from 70 to 76 feet high with an inch nozzle with a pressure of from 40 to 44 lbs. to the square inch, and even with two jets attached to the nozzle to very much the same height. If that system were extended it would obviate very much the necessity for fire engines in the City.

339. Always supposing the pressure continues when the draw upon the mains is very considerable?—Quite so.

340. You have not got a constant supply throughout the City at present, have you?—No; by no means.

341. Only at certain places?—No.

342. Can you state at all the distances from each other at which the 1,000 hydrants which are talked of are proposed to be put down in the City?—I believe it is to be between 60 and 70 yards.

343. Will hydrants placed at those intervals cover the whole area of the City?—That I am not prepared to say. I am not acquainted with what the arrangements are. Mr. Heywood, the engineer, will be able to give you that better than I can.

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344. Do you think the present force of the brigade is sufficiently strong for its purposes as far as the City is concerned?—I think quite so as far as the City is concerned.

345. And that the number of stations in the City is quite sufficient for the protection of property there?—We have three fire-brigade stations actually in the City, and four more in the immediate neighbourhood. The area of the City is only a square mile altogether; rather below that I believe than above.

346. Do you suggest any other means of increasing the facilities for extinguishing fire than those you have stated, namely, a system of constant supply and hydrants?—I think it would be useful if we had small hand-engines at each of the police stations, with a supply of fire buckets.

347. That leads me to ask you whether you think you could increase the efficiency of the brigade greatly by amalgamating the brigade with the police force, or by making the police force and the brigade force more united in the way of giving assistance to each other. At present, as I understand, the police force is principally for the protection of property and the maintenance of order, and that whilst they assist the fire brigade to a great extent, it is not part of their duty to do so?—No; the duties of the police and of the fire brigade are essentially distinct.

348. Do you think that either by amalgamation with the police force or by bringing the police more into unison with the brigade, in the way of working the engines and training the men for fire purposes, you might effectually strengthen the fire brigade?—So far as the City of London is concerned, I do not think that it would appreciably increase the efficiency of the fire brigade to incorporate them with the police. At this moment the police really do to a certain extent act as firemen until the arrival of the fire brigade; but the moment the brigade arrive the police confine their duties entirely to keeping order, saving property and endeavouring as far as they can to save life, leaving the fire brigade to discharge their own duties, while assisting them in every possible way.

349. Of course that assistance would be greatly increased if you placed at the disposal of the police, hose, ladders, and things of that sort, and other material which they could use for the purpose of fire extinction before the brigade arrived?—That is exactly what I alluded to in saying that I thought it would be useful to have some of those appliances at the police stations.

350. Would you go further than that and suggest the multiplying of the places where such appliances should be stationed?—The area of the City is so small, and the police stations are so near each other, that I do not think there would be any great practical utility in multiplying these places. There are six police stations, and three fire-brigade stations within an area of one square mile, and the means of communication between them are very rapid indeed as it is, all the stations being connected by telegraph wires, so that in a moment almost we hear at my office what is going on, and men can be assembled without difficulty at any spot where they are wanted.

351. You think that the existing stations of the police and the fire brigade together are sufficiently near at almost any point of the City to bring the appliances if they were kept there to bear upon a fire at once?—They are so, except under peculiar circumstances. I think there would be very few cases in which that would not be so.

352. It is the fact, is it not, that if you can bring those appliances to bear within a minute or two, you will very often prevent a fire from becoming so serious as to require the whole force of the brigade when they get there; you stop the fire in fact at the beginning?—Precisely, and many fires are so stopped now, as I said, before the brigade arrives.

353. Have you any such system in the City as they have in the metropolitan police force, namely, men being stationed at certain fixed points during the night?—No, not in that sense; we have men regulating the traffic, and so to speak they are at fixed points during the day; but we have no necessity for men to be stationed at fixed stand-points in the City, because our men's beats are so close together.

354. Then it only remains to ask whether, if the material were placed in boxes between the stations, that would be useful in diminishing the time within which means of extinction might be brought to bear?—It would be useful to have a

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hose, for instance, to be attached to the hydrant kept in some covered place, so that the police could screw it on, and have it ready for the brigade when they arrived.

355. And the police themselves, if the hose were kept close by the hydrant in a place of which the police had the key, would very often be able to put the fire out without the service of the engine at all, would they not?—At all events, everything would be quite ready for the brigade to go to work immediately if the system of hydrants were established, and it would stop the waste of water. A great part of the water turned on now runs away, because it comes in so much faster than it can be pumped out, whereas, if hydrants were used, there would be but little loss of water.

356. You might, if such appliances were fixed to the hydrants, communicate with the police station from your fixed point by telegraph, and thus bring the power of the force to a fire?—The distances are so short that I do not think it would be necessary.

357. With reference to the present drill of the police, do you think it would be any advantage to give them some knowledge of the working of engines and the other appliances, so that they might more materially assist the brigade when they were at a fire?—I do not see how they could more materially assist them than they do at this moment; it requires very few firemen to do all that is actually necessary in working the steam engines, and so far as working the hand engines is concerned, there is always an abundance of people to do that; it does not require any special training.

358. You do not think there would be any special advantage in giving the metropolitan police force, as they do the police who are stationed at Woolwich and the dockyards, a course of drill in the fire brigade?—In the dockyards, as I understand, the police really constitute the fire brigade. If a fire breaks out in a dockyard, especially at night, there can be very little necessity for the services of the police as police, because the dockyards are closed at night and the public have no entry to them; few people live there, and the police can have little difficulty in giving their whole assistance towards putting out the fire; whereas, at a fire in London, the great difficulty of the police is to keep the crowd back, and to enable the fire brigade to work easily and without interruption. I do not think that the case of a dockyard is at all parallel to that of one in London.

359. What is your system when a fire is notified to a police station; do the reserves turn out?—Yes, if necessary, every man in the station turns out; we know by telegraph whether the men are wanted or not. "A fire" is first reported, and in the next few minutes it is reported "the fire is out," or "more men are wanted," and they are then taken from the different stations in such numbers as may be required.

360. Do you think that, under your existing arrangements, from the fact that the area is so limited, you will have as good arrangements as you could have, after the arrangements are completed which you have mentioned for the constant supply of water, and the greater facility which would be afforded by the use of hydrants?—I quite think so.

361. I should like to ask you a question which, I think, I have had the pleasure of asking you on another Committee, namely, whether you are in favour of a superannuation fund for your police force?—I am in favour of that very strongly.

362. This Committee have to examine into that point; you would, I suppose, support the same view with regard to the fire brigade?—Yes; I think it is quite necessary in the case of the fire brigade or of any other public body, that they should be well paid, and have a certainty of pension after long service.

363. Has your attention been called to the Report of 1872 by the Society of Arts, on the subject of the protection from fire which was required at theatres?—I have just received that Report, but I have not had time to look at it yet.

364. There are no theatres in the City, therefore you have no danger of that kind to apprehend?—We have not.

365. Mr. *Onslow*.] Have you no music-halls in the City?—We have no music-halls in the City. The nearest, I think, is the one in the City-road, and that is just outside the City.

366. *Chairman*.]

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366. *Chairman.*] Then that part of Shoreditch where the Grecian Theatre is is just outside your boundary?—Yes; it is just on the border, but it is outside the boundary.

367. So, you have not considered the question at all whether protection from fire in theatres is necessary?—No; I have had no necessity to consider that.

368. The hydrants, as I understand, have not yet been put down in the City?—Not yet.

369. You have had no experiments made with regard to them, at which the police have been present?—No. I may observe that I see in this paper which has been given me, it is contemplated that the police are to be used in connection with the fire brigade. I have had no communication from the author, and I am not able to understand exactly how it is proposed that the police should be made use of. I presume it to be proposed that they should be taught and prepared to screw on the hose to the hydrants for the use of the fire brigade.

370. You think that the increase of duties is very small which need be imposed upon the police with regard to a fire?—Very small indeed.

371. And that you would not get, as regards the protection of the City, any great addition to the present means of extinguishing fires, if the two bodies were incorporated?—I do not think there would be any at all.

372. You are aware that Captain Harris gave evidence before the Committee strongly advocating the amalgamation of the forces from the fact that the police, as a reserve to the fire brigade, would be a material assistance?—I am aware of that; but upon reading Captain Harris's evidence I could not gather that he gave any strong reasons for it except that there would be no divided responsibility, that there would be greater unity of action, and so on; but my impression is that the duties of the police and of the firemen are so distinct and separate that in all probability you would make indifferent firemen out of good policemen; and the Metropolitan Fire Brigade being then incorporated with the metropolitan police must necessarily be policemen also; that, I think, would create difficulties which perhaps Captain Harris has not considered.

373. I suppose Captain Harris recommended that from the fact of the much larger area over which the police act; the principal point of his recommendation was that you should increase the number of places from which you could bring appliances to bear upon a fire, and that that might be done by police assistance?—That is quite a different thing, I think, from incorporating the two forces together. To have a system of fixed points is a thing which we do not at all require in the City, but it might be very advantageous elsewhere if from each of those points telegraphic communication existed with the fire-brigade stations in the district and the police stations, so that the man at the fixed point could give notice of a fire in his immediate neighbourhood. My reason for saying that is that their beats are more extended than ours, and it might be difficult for a man to leave his post and go to a police station to give notice of a fire breaking out, but I do not see that that has a practical bearing upon the question of incorporating the two bodies together.

374. Captain Harris spoke of incorporating the men, and he spoke also of the assistance which the police might give if they were not incorporated, but if they were drilled so as to be able to use the minor appliances in the interval of time before the fire brigade could be brought to bear upon a fire?—But I do not think Captain Harris stated what those minor appliances would be beyond the hose and hydrant, which the police could use without any such special training as firemen require.

375. What he suggested was, that at all these fixed points, multiplying thereby the number of stations where fire appliances should be placed, there should be put hose, hatchets, buckets, and a ladder, and small appliances of that sort, which would enable the policeman who was near a fire to attack the fire with a certain degree of training in fire work, in the interval of time before the brigade and the other officers who were informed of it could arrive?—I should think a single man so situated would have quite enough to do in preparing for the people who were to come to assist him, rather than to set to work himself, unless it were to go in with a bucket and extinguish a fire close at hand, which he might do if there were a man to help him, but in all the busy parts of London a crowd collects so quickly, if there is an alarm of fire, that the man would, I imagine, have enough to do in dealing with them.

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376. But the fixed point man would not have so much to do with looking after the crowd, because the policeman on the beat and his comrades whom he had summoned would do that; the policeman on the fixed point could take the hose and carry it up to the second floor if the fire was up above, and so bring the water to bear upon the fire?—I think an intelligent man would do that now without any practical training. I presume the man who would be put upon the fixed point would be selected for his intelligence, and that he would be able to do so, and there would be no necessity for uniting the bodies for such a purpose.

377. In your view the bodies need not be amalgamated, and yet that the police might assist more materially than they do at present in dealing with fires in their origin?—I think so in the metropolitan police district, because, as I have said, the beats are wide and in some cases the men are so far apart that anything which would bring the men together more rapidly would be useful.

378. Looking to the objects which the Committee have in view, is there any other point which you would like to place before the Committee with regard to the working of the brigade and improvements you would suggest in it?—The only point in which I think the efficiency of the fire brigade might be improved in the event of their being incorporated with the metropolitan police, would be this: I apprehend it is necessary for the efficiency of the fire brigade that the men should be young and active, much more so than is absolutely essential in the police, and therefore, in all probability, they become unfitted for their duties at earlier ages than the police do. If they were all incorporated together they would, practically, all be policemen; and it seems to me possible that the men of the fire brigade, when they arrived at a certain age and became unwieldy, and unfit for the more active duties of firemen would, by being removed into the general police force, be able to continue their services up to a longer period, and so earn superannuation; they would then be trained men, who had gone through a long course of fire service, and would be useful afterwards in assisting the fire brigade; I cannot imagine that a man at 40, who has been, say, 20 years in the fire brigade if he joined at 20, would be very efficient for the active duties of the fire brigade afterwards, although he might make a very useful policeman, and so complete his service.

379. In that view, as getting the greatest efficiency out of the men, you think amalgamation might have some force?—Quite so. The only drawback to that is this: that under the present system of the fire brigade they are not particular about a man's height, whereas there is a standard of height for the police, and men could not very well be drafted from the fire brigade into the police unless they came up to that standard.

380. The fire brigade take their men principally from sailors?—Yes, irrespective of height. I have in the City men who have been in the fire brigade who make very efficient policemen, but they are, of course, men whose height was sufficient to enable me to take them.

381. Mr. *Onslow.*] I suppose you get a report every morning of the fires which have occurred?—I get a report of every occurrence of importance within the knowledge of the police which takes place in the City.

382. Do you get a special report whenever the turncocks arrive late?—Yes, if there is any difficulty about the water, in consequence of the absence of the turncock, a report would be made to me, and always is.

383. Have you a statement with you which would give the Committee the number of times within the last two years that such a report has been made?—I could prepare one if the Committe desire to have it.

384. If you had a constant supply of water throughout the City I suppose you would not require those turncocks at all?—No; if there were this constant supply at high pressure there would be no necessity for turncocks.

385. *Chairman.*] Would the return as to the number of times when the turncocks had been late in the City appear in Captain Shaw's annual report?—I am not sure, but I think most likely it would; it would be more his business clearly than mine to report that.

386. Captain Shaw deals also with the City as well as with the metropolitan area, and therefore the fact might appear as to both?—Yes, I think so.

387. Mr. *Onslow.*] Distinguishing between the two?—Yes, whenever it happened.

388. I suppose there would be no difficulty at all with reference to keeping buckets at the police stations?—None whatever; they would be very useful.

389. I think

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389. I think you remarked that hand engines could also be kept at the police stations?—I think they would be of advantage.

390. Would not that entail the alteration of some of your stations?—Not at all.

391. You would have room say for a couple of small hand-engines at the police stations?—I should think that one would be sufficient, because engines of that kind could only be useful to extinguish a fire at its first outbreak.

392. I understand you to say that none of your police have keys of the cocks?—None; and they would be useless if they had, because the system of the mains is only known to the turncocks themselves.

393. Are those lofty buildings which you have spoken of, built now particularly with regard to protection from fire?—That I am not prepared to say; I believe they are as far as they can be, but I do not know how far that is.

394. Your police, I presume, always work harmoniously with the fire brigade?—Quite so.

395. Can you tell me how many hydrants are laid down at present in the City?—There are none at present at high pressure for public purposes, but they are beginning them now, and it is intended to complete them up to 1,000. The engineer to the Commissioners of Sewers will give evidence to the Committee upon that point. It is in his department and not in mine.

396. Watling-street is in the City, is it not?—Yes, in the very heart of the City.

397. The old head station was formerly in the heart of the City?—Yes.

398. I call it old because a new site has been chosen?—I was not aware of that.

399. Would you recommend that the head station of the fire brigade should be in the City or outside the City?—I think it could not be in a better place than in the City, certainly; there is such an immense amount of valuable property round Watling-street, and such a number of warehouses in the City left unoccupied at night, that to have the chief station of the fire brigade in the City, and not far from where it is now, would be very desirable.

400. Is it your opinion that the Watling-street station is sufficiently large for all purposes of putting out fires in the City?—That I would not venture to offer an opinion upon.

401. I do not know whether you have made a calculation, but could you tell me what the per-centage of fires is in the City compared to the rest of London?—I have no knowledge of that whatever, but I fancy that could be easily ascertained from Captain Shaw's report also.

402. Would you recommend that there should be a telegraphic communication between each police station and each fire-brigade station in the City?—I do not think that would be necessary in the City; I think if there were telegraphic communication between my office and the chief office of the fire brigade that would be sufficient, because my office is connected with the other police stations by telegraph, and of course we could communicate with them instantaneously in that way. I do not see any actual necessity for telegraphic communication between each police station and each fire-brigade station.

403. Supposing the head fire-brigade station were outside the City, would you recommend that it should be in communication with all the police stations within the City?—Yes; I think that might be a useful arrangement.

404. An honourable Member suggested to me that a new station is being built; you have no knowledge of it?—I have no knowledge of it; I never heard of it.

405. Do you give any rewards to your policemen for any vigour displayed in putting out a fire?—Not specially for putting out a fire; they are rewarded on special occasions whenever they distinguish themselves. I always, if I possibly can, give a reward for vigilance or for extra bravery.

406. Mr. *Forsyth.*] Would that be a money reward?—It might be a money reward, or sometimes I reward by promotion; it depends upon what the man has done.

407. Mr. *Onslow.*] Were you present at the fire at Brook's Wharf last year?—No, I was not; I was away.

408. Taking it from me, for I was there, can you tell the Committee how it was that there was such an enormous waste of water running in the streets at

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that time?—I am told that at all occasions of fire there is always an enormous waste of water, because the supply of water is much larger than the engines can throw upon the building.

409. I suppose that would be the case where there was a constant supply?—As soon as one of these plugs is taken out, it flows too rapidly; they have a sort of trough into which the water flows, and it is taken from there into the engine, but the overflow is so great that there is always a good deal of waste, which runs down the street, and that would be obviated by employing hydrants on a system of high pressure; there need be no waste of water then.

410. Is the whole of the City under constant supply?—No, not now; it is turned on periodically there, as it is elsewhere, except at special buildings; for instance, at the Post Office, and some public buildings, they have a constant supply, with hydrants and everything requisite, somewhat similar to what they have, I think, in the Houses of Parliament.

411. Have you any reason to believe that there are many fraudulent fires in the City of London?—We have very little evidence of that, but I think there are very few; they are chiefly accidental.

412. Whenever a fire takes place, do the police make a thorough investigation with reference to the causes of that fire?—No, not unless there is some reason to suppose that it has been intentional.

413. Would you recommend that a searching investigation should be made after every fire?—I should scarcely think that would be the duty of the police; the duty of the police is rather to take action when there is a strong suspicion that something fraudulent has taken place. I do not think it would be the proper duty of the police to institute an inquiry to ascertain whether a thing had been done intentionally or not; it would be more the duty, I should think, of the insurance office, or the fire brigade.

414. But suppose it were a case of suspected fraud?—In that case the police would be put into operation at once.

415. Have you any means of ascertaining how much property in the City is insured?—I have no means of knowing that.

416. Supposing this Committee were to recommend that the police and the fire brigade should be amalgamated the City police must come under that amalgamation, must they not?—I do not quite see how they could.

417. You would not recommend that the City police should be separated from the rest of London, in the case of an amalgamation?—That seems to me to be one of the chief difficulties about the proposition of amalgamating the present fire brigade with the metropolitan police force. So long as you have two distinct police forces in London, I think that of itself presents a very great difficulty. As I understand it, the proposition is that they should be incorporated with the metropolitan police force, and if that is so, every fireman would necessarily be a metropolitan police constable. Then a great many of those would be actual residents in the City, and you would have to repeal the present Police Acts, or some portion of them, because no metropolitan police constable, under the Police Act, can act in the City of London, without the direct authority of the Secretary of State, upon the application of the Lord Mayor; and *vice versâ*, the City police cannot act out of the City without the consent of the Secretary of State, and upon his application to the Lord Mayor; that is one of the reasons why, under existing circumstances, I think it is more convenient that the metropolitan fire brigade should be under a separate authority, because each police force can act as auxiliary to it; but if the fire brigade is incorporated with one and not with the other, you come to a practical difficulty at once.

418. I suppose from your answer you would say that if the suggestion were carried out you must amalgamate the City police and the metropolitan?—That seems to be the natural outcome of it, or rather that the one would be necessary before you do the other, and that is an arrangement which I am quite sure the City would resist to the utmost.

419. But for the purpose of putting out a fire, would there be any difficulty with regard to any of the police acting outside their boundaries?—There would be no difficulty in their acting, but under the existing law it is a roundabout process only which will enable them to do so.

420. That is for the protection of life and property, but I am talking about the putting out of fires?—That is the very first description of protection of life

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and property; if you extinguish a fire you save property, and possibly you save life.

421. Are there many large buildings in the City which employ special men always on duty to give notice in case of fire?—Private individuals have private watchmen of their own, and some of them employ police constables and pay for them specially; and public buildings, such as the Bank of England and the Post Office, pay for police constables, who are always on duty there; those men would of course give notice at once in the event of a fire breaking out.

422. Sir *Henry Peek.*] I understood you to say that the City had no direct authority over the fire brigade?—None whatever; the men under the Metropolitan Board of Works act in the City as they do in the metroplitan district.

423. I understood you to say there were three fire-stations in the City, and four near the City, and you thought that by them the City was sufficiently protected?—I think it should be, assuming of course, which I do not doubt for a moment, that the Metropolitan Fire Brigade is deficient neither in number nor in other ways.

424. That is the next question I wish to ask you; have the brigade enough men, in your opinion?—As far as the City is concerned we have never found them deficient in numbers, but looking at the small number of men which Captain Shaw has at his disposal, which is something under 400 men now, that seems to me a very inadequate number to protect the whole metropolis from fire; because if two large fires were to break out at the same time in two wholly different directions, I cannot imagine that Captain Shaw could cope with them with the number of firemen at his disposal. It seems to me also, with regard to the incorporation of the fire brigade as part of the metropolitan police, that under any circumstances it would be necessary to increase the number of men, either as policemen or as firemen, to be of any practical use at all. The metropolis is increasing in its area every day, and the number of houses is increasing, while the number of the police does not increase in proportion; and apparently the fire brigade does not increase in number, at all events in proportion to the area of the metropolis. It seems to me, merely as an outsider giving an opinion, perhaps without very much thought, that Captain Shaw must be very hard worked just now to get on as he does with only 400 men.

425. Passing on to the question of water supply, did I understand rightly that the whole City is supplied by the New River Company?—I cannot tell you for certain, but I think it is; this is the statement given of Mr. Heywood, engineer to the Commissioners of Sewers. He says, "Hitherto the branches which have been laid in communication with the mains of the New River Company, and which have a constant supply, and to which hydrants will be fixed, have only been laid in streets which have been repaved by the Commissioners of Sewers in different parts of the City during 1875 and 1876. Upon these it is proposed to fix 173 hydrants, and further branches will be laid this year for 63 hydrants upon streets about to be repaved. It is further proposed to extend, as soon as practicable, the application of hydrants to a particular district in the City, so as to facilitate their application in cases of sudden emergency. The mode of carrying out such application is still under consideration, but it has been thought that it might be best done by the police."

426. The New River Company, I think, gives a greater pressure than any other of the water companies?—I am not prepared to say that.

427. If the City be solely supplied by the New River Company, there ought to be no difficulty in finding the turncocks, ought there?—I can give you an account of what occurred at the fire to which I was recently alluding, and the residences of the different turncocks. A constable of the name of Adams reports that, "At seven p.m. a fire was discovered by some person unknown at the Polish Synagogue, No. 10, Cock-hill, New-street, Bishopsgate, in the parish of St. Botolph. A bystander informed the firemen at the brigade station, Bishopsgate Without, who promptly attended; and police constable 923 Johnson informed the following turncocks:—William Bully, No. 20½, Camomile-street, who was ill in bed; William Johnson, No. 12, Artillery-lane, who was too ill to attend; William Wright, No. 1, Clifton-street, Finsbury, who was absent; and Daniel Thake, No. 4, Red Lion-court, Minories, who immediately attended.

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428. He went to three and found them ill or away before he found one who could turn the water on?—Two were ill, one was absent, and a fourth who was found, and came to turn the water on.

429. Probably by that time the place would have been burnt down?—No, fortunately the fire had been extinguished by hand-pumps before the engines arrived.

430. What time was this?—Seven o'clock in the evening.

431. If the City be well supplied with hydrants, at 70 or 80 yards distant, with those hydrants, in your opinion, would fire engines be almost unnecessary?—I should think so; at all events, it would be much more easy to extinguish fire than is the case at present with the assistance of engines. It seems to me that with small hand engines to do what was done on this occasion, namely, to get at the fire promptly and get it under before it extended, and with the assistance of constant high pressure afterwards, you might almost do without steam fire engines except upon the river frontage, where they would be wanted.

432. Let me read to you Question 5159, which was put to Mr. Thompson, who described himself to the Committee as Chairman of the Fire Brigade Committee of the Metropolitan Board of Works; he was asked, "You have mentioned the word hydrants, and that brings us to the question of the water supply of the town at present; are you of opinion, with other members of the Metropolitan Board of Works who have given evidence before this Committee, that it would not be advisable to apply hydrants throughout the town, unless in doing so you could do away with the use of engines;" to which his answer was, "I never was more convinced of the necessity for our having always as good a staff of engines as we have at the present time than I was last week. After leaving this Committee and going into the City I was present at the fire at Brook's Wharf. I have a tracing here of Thames-street and its neighbourhood, and the position of Brook's Wharf with regard to the neighbourhood. Now, if Thames-street had had hydrants placed even at every 200 feet along it, Brook's Wharf is so placed at the end of a long narrow entry 300 feet away from Thames-street, that had there been a hydrant exactly opposite that entry the building would, nevertheless, have been 300 feet from it. If the hydrants were placed 200 feet apart it might so happen that 100 feet from the end of that entry was the nearest hydrant that could be brought into action. Now, it seems to me that at the most at that fire you could have brought three, or it might be five, hydrants, to play upon it, whereas there were nearly 20, I think, of our steam engines there in a very short space of time after that fire broke out, and all of them were wanted to control that fire, therefore I do think that whatever expense the metropolis may be put to in the case of hydrants, and however serviceable they may be at times in putting out small fires, the other establishment, our engines and our stations must all be kept up to the same amount as they are now if some fearful catastrophe is to be obviated." Would you as a practical man agree with Mr. Thompson or not?—I think I should not agree with him altogether, because in this very instance to which he is alluding the engines were not found sufficiently powerful to send the water up to the top of those buildings; not up to within two storeys of the top. I do not know what the actual strength in number of the engines they have at this moment is, but it would be hardly conceivable that it would be necessary, I think, to keep them up to their present strength if you had the assistance of hydrants also. Doing away with them altogether would be another matter. Captain Shaw would be able to give a much better opinion upon that than I can.

433-4. Mr. *Clifton*.] I think I understood you to say that the engines were not powerful enough to send water to the roof of the building which was on fire at Brooks' Wharf?—So I was informed. I was not present myself, but I asked again yesterday, and I was told that the engines which were working on the river at that fire were not sufficiently powerful, or, at all events, were unable to send a jet of water to the top.

435. You say the engines on the river?—Yes.

436. I should like to know whether that was the case with the land engines?—I cannot tell you that; but I fancy those engines on the river are as powerful as any of them.

437. Are you aware whether there was a high wind blowing, or anything of that

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that kind, that was likely to diminish the force of the jet?—I cannot tell you that; I can only give you the information as it was given to me. It was reported to me that the building was so high that the water did not reach within nearly two storeys of the top; and that would be the case with a number of buildings facing the Thames which are now built so high as they are.

438. Was that reported to you officially?—Not at the time, but merely upon making inquiries, knowing that I should have to give evidence here.

439. With regard to the report which you get every day about fires, and the absence or presence of turncocks, &c., is that reported by your men, or is it reported by the fire brigade?—It is reported by my men.

440. It is an independent report altogether?—Yes; I do not receive any reports of any kind from the fire brigade.

441. Mr. *Stewart Hardy.*] Do you think that hydrants would be likely to deliver water higher than the engines would?—I should think they would. Under a system of constant high pressure it has already been shown that you can send water up to 70 and 80 feet, and that is a great height.

442. But you are aware what the Parliamentary pressure of the different companies is, and unless you altered that Parliamentary pressure the hydrant would certainly not throw water on the top of Brooks' Wharf?—That is a matter upon which I have not special knowledge.

443-4. Sir *James M'Garel-Hogg.*] Have you seen the answer to Question 5222, where the Honourable Baronet in the Chair asked this question: "Were any floats employed at that fire?" that is, Brooks' Wharf; and the Chairman of the Fire Brigade Committee said, "I am told by Captain Shaw that all our floats were there and did good service; the Honourable Baronet asked me a question on that point, and Captain Shaw told me that the floats were there in time, and unless interfered with by the wind, that they did effectual and good service;" what you have mentioned is only hearsay?—It was mentioned to me by the inspector of police who was there on that occasion, that the engines which were working from the river were not able to throw water up to the top of the building, or nearly to the top of the building.

445-6. Mr. *Hankey.*] I think you stated that you considered the duties of the police and the firemen to be so different that you thought if the fire brigade were amalgamated with the police many men might be very inefficient firemen, though very good policemen, and *vice versâ*?—That was more upon the supposition that if the fire brigade were incorporated with the metropolitan police, the firemen, after they became incapacitated for their own active duties as firemen, might yet complete their term as policemen, being as they would be, if incorporated, all police constables, and that that would enable them to become eligible for superannuation, and to be useful also afterwards as reserved firemen to assist the more active men in that body.

447. But quite apart from the system of superannuation, do you consider that there would be any reason for supposing that if a certain number of your men were trained specially out of every company for fire duty, they would be rendered less efficient as police constables?—If they were so employed at all fires, it would of course take them from their proper duties as police constables.

448. But of course it would not render them less efficient as police constables in their ordinary capacity as to intelligence?—By no means.

449. I think you stated that the City police could not act out of the City, and *vice versâ*, that the metropolitan police could not act in the City without certain orders from the Lord Mayor on the one hand and the Secretary of State on the other hand?—Yes, that is so.

450. If there is any disturbance on the boundary of the City, do you consider that your men are not able to assist and join the metropolitan police?—They would do so as a matter of course if they saw anything wrong going on. For instance, if one of our men on the borders of the City saw an assault committed, or saw any felony about to be committed, it would be his duty, whether a policeman or not, to interfere, and he would do so at once; but I am speaking of employing bodies of the metropolitan police to assist the City police, or of the City police to assist the metropolitan police, which latter of course they do not require, as they are so strong.

451. If a fire occurred upon the boundary line of the City, would there be any

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any objection upon your part to give every aid by your police to extinguish it?—Certainly not.

452. Nor as regards keeping order?—No; they would keep order if the fire was immediately upon the boundary, until the metropolitan police were there in such numbers that they did not require our assistance any longer.

453. Do you not believe that the metropolitan police would do the same?—I am quite sure they would.

454. Then practically the boundary would not be any obstacle to the performance of their duty by the police in the immediate neighbourhood?—What I referred to was the policy of incorporating the metropolitan police with the fire brigade, that you would then have permanently stationed in the City a number of metropolitan police constables who would really have all the power of metropolitan police constables within the City.

455. Mr. *Hardcastle.*] Do you think that an arrangement would work well by which the same man acted as a constable and as a fireman, employing part of his time in one capacity and part in the other?—I think that would be attended with very great inconvenience; the duties of policemen and firemen are so essentially distinct, and their qualifications are so different altogether, that I think you would probably have a bad policeman and an indifferent fireman, if he were trained for both purposes, and used indiscriminately for either.

456. I understood you to say that one of the difficulties of making firemen into metropolitan policemen would be that they could not act in the City?—That is one reason.

457. I do not myself see, if they are simply under the metropolitan police, and simply act in the City in their capacity of firemen and not in the capacity of policemen, why they should not act in the City?—They must necessarily be policemen, and sworn in as such, and have all the authorities and powers of policemen, notwithstanding that they would be called the fire division of the metropolitan police, but they would be essentially constables. It might be necessary to send in an additional force of constables with them, not for the purpose of working the engines, but for the purpose of keeping order, and those men would come in as constables purely.

458. But in your opinion such an arrangement would not work well?—I do not think it would work harmoniously. I am afraid not.

459. Is there any town within your knowledge where the police force and the fire brigade are united in that way?—They are united to a certain extent, I understand, in Manchester.

460. That is to say that the firemen are constables, and sworn in at Manchester?—That is the case at Manchester, I believe.

461. I believe not. It is in evidence that the two forces are kept perfectly distinct, although they are under the government of the same watch committee?—They are under the same head. The watch committee at Manchester are practically the commissioners of police.

462. But I do not think they are sworn in as constables?—That I am not aware of, but they are under the same authority.

463. You stated that you thought that Captain Shaw was much overworked, and that the number of men under his control was insufficient; have you any knowledge of any cases of fire in which the number of firemen has been found to be insufficient?—No; I merely gave that as my opinion, without any practical knowledge of it, for as far as the City is concerned certainly, we have always found the services of the firemen efficient; they have always acted very efficiently indeed. But, judging from the area of the metropolitan district, and looking at the number of men which Captain Shaw has at his disposal, it seems to me that if two or three large fires occurred simultaneously, he would be very much pushed to extinguish them.

464. There is only one other question which I wish to put to you; you stated that at Brooks' Wharf the engines were insufficient to carry the water to the top of the building; have you any reason to suppose that hydrants would have been able to carry the water higher than the engines?—I should think they would, judging from the experiments which have been made, that hydrants at a high pressure have already sent water up to a height of between 70 and 80 feet, and that is higher, or quite as high, I believe, as the top of those buildings at Brook's Wharf.

465. Have

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465. Have not fire-engines been able to send up water as high as that?—I am not sure, but I believe not.

466. Mr. *Forsyth.*] I will ask you this question generally; do you, or do you not, think there would be advantage in amalgamating the fire brigade with the police, supposing there to be no question of separate authority as between the City and the metropolitan police?—I think there would be very little practical advantage in it.

467. I am desired to ask you whether you think there would be any considerable saving to the ratepayers in the City of London by the amalgamation of the City police force with the metropolitan police force?—Yes; there would be a very considerable saving to the ratepayers of the City of London, and to the funds of the Corporation, if that were done, because at present the Treasury pay one-half of the police expenditure of the metropolitan district, and the ratepayers pay the other half. In the City, the ratepayers pay three-fourths of the police expenditure, and the City cash pays the other fourth. The City police is the only police force which derives no assistance from the Government at all in any shape whatever; and therefore, if the two police forces were united, I presume that the Treasury would act towards the City as they do towards the rest of the country, and there would then be a saving to the ratepayers of one-fourth of the present expenditure, and of another fourth to the Corporate Funds.

468. Mr. *Onslow.*] Do I understand you to say that you have no place at all of public amusement in the City?—We have no theatre at all or place of that kind.

469. You can have a place of public amusement without its being a theatre; would you like to give the Committee any evidence with regard to this instruction which has been added to their reference. "That it be an instruction to the Select Committee on the Metropolitan Fire Brigade that they have power to take evidence and report with special reference to better means of preventing loss of life and property from fire in theatres and other places of public amusement"?—I do not think there is any place in the City that would be fairly referred to in that paragraph.

Mr. *James L. Shuter*, called in; and Examined.

470. *Chairman.*] You are, I believe, the Chairman of the Gas and Water Committee of the Corporation of the City of London?—I am.

471. And in your capacity as chairman you have had before you this question of the protection of the City from fire?—Yes, I have.

472. The City I understand has not been satisfied with the arrangements which have existed up to the present time?—It has not been.

473. Can you tell the Committee what it is now proposed to do in order to increase the existing facilities for extinguishing fire in the City?—We have up to the present time laid out 173 branches from mains with constant supply, and we are now about to lay down 63 more branches, and to connect them also with mains on constant supply, and we have also determined to place hydrants to those branches. The Corporation having admitted the principle of supplying those hydrants, I think I may be perfectly justified in saying that the hydrants will be continued throughout the whole of the City.

474. What you propose to do is gradually, as you are repaving the streets, to establish a system of hydrants?—I think we propose to do more than that, only when we are repaving the streets, we take advantage when the roadways are up of immediately doing it; but I think what we now propose to do is, that we should immediately in connection with those which are already placed, complete a police district before we extend the hydrants to the other portions of the City.

475. Will you tell the Committee in what sense you use the term "police district"; into what number of police districts do you divide the City?—Six.

476. And you are proposing to deal with one of them now?—Immediately.

477. Is it with regard to that district that you state you are about to lay down 173 hydrants?—The branches of the hydrants are already laid, and we are now entering into a contract for the hydrants which are to be placed there.

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478. And the 63 are in addition to the whole in the same police area?—Yes.

479. Can you tell the Committee what amount of mains in the City are kept constantly charged?—I cannot; but we can connect the hydrants with mains that are constantly charged, and have them throughout the whole of the district.

480. Then where the mains are charged you propose as quickly as possible to establish a system of hydrants?—Yes, and wherever there are mains we make connection from the mains to the hydrants.

481. And do you believe that by the application of those hydrants to your existing water supplies you will get very much greater facilities given you for extinguishing fires than you at present possess?—The facilities will be very much greater.

482. Under the existing pressure that has been supplied by the company?—With the existing pressure. We have made several experiments, and have been able to throw water with an inch nozzle to a height of 75 feet, with a double hydrant even.

483. Did your experiments extend over any time, or was it merely an experiment of a few minutes?—It lasted a considerable time.

484. And the pressure of the water still remained, giving you a jet of that height?—It remained quite undiminished.

485. What was the length of the hose that you tested it with?—The hose was about 30 feet long.

486. And with from 30 feet of hose attached to a hydrant you got a jet through an inch nozzle of from 70 to 75 feet high?—From 70 to 75 feet; the height would depend upon the wind.

487-8. There still was a continuous supply even under your existing pressure?—That pressure then being between 38 and 40 lbs.

489. Then your experiments do not bear out the evidence that was placed before this Committee by Mr. Bramwell that the length of hose, diminishing the jet as it would do, really rendered the application of hydrants on the existing system of water supply useless to the town?—No; but then I do not know what the effect would be where there was a greater length of hose, but it would not be very great. Of course a greater length of hose would diminish the height of the column.

490. Mr. Bramwell stated this in answer to a question, "I say the reason why it would not be expedient to expend money upon hydrants for such a pressure are as follows": and then he refers to the pressure given by the East London Company?—That is a very different thing. Nearly the whole of the City is supplied by the New River Company; a small portion of it is supplied at the East End by the East London Waterworks Company.

491. Can you give the Committee the difference, to your knowledge, between the pressure supplied by those two companies?—No; but I heard Mr. Bramwell say that the pressure given by the East London Company was very much less than that given by the New River Company, and I understand that the New River Company propose giving us a greater pressure than we now have.

492. That is to say that their pressure is now greater than their statutory pressure, and they propose to increase their pressure still more?—Yes; and we hope to get a column of water thrown something like 100 feet high.

493. Do you think that will be the case when the whole of your district is laid under constant supply?—Yes, we tried one experiment with hydrants; we had them all double.

494. At present the pressure given by the Act, I believe, is 300 feet from Trinity high-water mark, and not exceeding 70 feet from the pavement of the street where the house is situated?—That is so.

495. And with the pressure they are now giving, your experiments have shown that with a hose of that length you could get a sufficient jet amounting to between 70 and 75 feet?—Quite so; and I may say (I think the information is worth having) that the hydrants which we propose to lay down are all double; we tried the two hydrants together and found no difference in the height to which the water was thrown.

496. And that was a continuous supply, and not a momentary supply?—There was nothing intermittent in it.

497. That evidence, I suppose, satisfied you and the City that you can adopt a system

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a system of hydrants which would give you very much increased facilities for dealing with fire?—The experiments which we tried seemed to justify us in recommending to the Corporation that hydrants should be supplied throughout the whole of the City.

498. I suppose your opinion was that by this application of hydrants you might materially diminish the necessity for steam appliances?—I certainly think we should diminish the necessity in one sense, but I do not think that we should recommend that there should be no steam appliances.

499. I do not mean that; but supposing it to be stated that the present fire brigade and its appliances are below what they ought to be for the protection of property in a town like London, and in the City proper especially, you might do away with the necessity of increasing them by substituting the increased facilities which you gain by hydrants?—Certainly.

500. And that fires might in many cases be extinguished by the hydrants without the necessity of bringing steam engines to bear?—I think you would probably save three-quarters of the damage which now results from fire, because the hydrants are so placed that they could be directed immediately upon the fire without calling for any turncock.

501. That would do away with the difficulty which Colonel Fraser stated occasionally occurred, of not being able to find the turncock?—Quite so.

502. Are you prepared to say in whose charge you would recommend those appliances should be placed?—We propose that the police should be initiated in the use of those hydrants, in point of fact that they should be drilled to it, and called out occasionally to a fire to put the hydrants into action.

503. With regard to putting the hydrants into action, do you contemplate in the establishment of this system making such additions to the appliances as hose being stationed near your hydrants so that the police on duty might at once apply the hose to the hydrants before any brigade assistance arrived?—Yes, that is what we propose.

504. I suppose you have gone into the question of the cost of those hydrants?—Yes.

505. Can you inform us what the ideas of your committee have been with regard to the cost of applying this system universally through the City?—We estimate the expense will be from 25,000 *l.* to 30,000 *l.*

506. Can you state what the cost is per hydrant?—From 25 *l.* to 30 *l.* per hydrant. We propose to put down the most efficient hydrant possible under the selection which we have already made, and that costs 10 *l.*; then the placing the hydrant, the hose, the jet, and the branches to the main would cost from 15 *l.* to 20 *l.* more.

507. Does that include the breaking up and relaying of the streets?—Yes.

508. The total cost, including the appliances for the use of the hydrants, will ultimately amount to between 25 *l.* and 30 *l.* per hydrant?—Quite so. We think 30 *l.* is the maximum.

509. You are aware that evidence has been given before this Committee to the effect that in places like Manchester, where the system has been established, they have done it at very much less cost?—We can place hydrants at less cost, but we do not think they would be so efficient, and, consequently, although they would be less costly in the first place, they would be more costly in the end owing to the repairs which they would from time to time require.

510. Did your Committee, before they determined upon those hydrants, consider the way in which this system has been applied in other towns?—Yes.

511. It has been stated that we could obtain hydrants at very much less than 10 *l.*; some of those which have been laid down at Manchester and other places costing under 3 *l.*, and that they have been placed and worked with perfect success; I wish to know whether your Committee, having considered that point, have any reason to believe that the success which was attained there could not be attained here?—I could not answer that question. I can only assert this positively, that we had several hydrants before us, and have seen none which commended themselves as being so efficient as those which we have at present determined to place.

512. The question before this Committee is a question of dealing with a very large area, the area of the metropolis, and although what I may call a luxury in hydrants may be adopted in the City, I wish to know whether your Committee

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consider that the hydrants which have been adopted in those other towns were for any special reason inapplicable to the circumstances of London?—No, I do not think the Committee thought that those hydrants would be inapplicable to London; but they thought those they have adopted to be very much better. I may tell you that we propose to have the hydrants arranged in many instances so that we can use them, if need be, for street washing.

513. In your 25 *l.* or 30 *l.* hydrants, you combine arrangements which you could afterwards use for other purposes than those of extinguishing fire?—Yes, and the New River Company are perfectly willing to make a fixed charge for the supply of the water.

514. Have not remonstrances been made by the Metropolitan Board of Works about that mode of cleansing the streets; that is to say, that washing your streets in that manner would practically mean sending all the mud which had collected in your streets during the day into the sewers?—We are about to place catch-pits throughout the City.

515. Is that part of the 25 *l.* or 30 *l.*?—No, that is another very large expense, but still what we do we always do well.

516. Forgive me, but I wanted to see if you had considered the question of cheaper appliances, and had rejected it simply because it would not succeed, or whether it was simply that you were anxious to have what I call the luxury of the very best hydrants?—The very best hydrants that we could get, and then there is this principle connected with them, that in all our hydrants we shall have auxiliary valves to shut off the water in case of repairs. In Manchester, I presume, they depend upon the water companies shutting down the mains; we wish to avoid shutting down the mains at any time when making repairs to a hydrant.

517. And though you are prepared to establish a perfect system of working those hydrants, there was nothing on the ground of economy, if you were about to adopt that system generally throughout the town, to induce you to adopt a system of hydrants less costly?—We consider that we have acted most economically.

518. Notwithstanding the evidence you must have had before you, that you could have done it for a very much less cost?—I think all persons will admit that we had the best evidence before us that we could possibly get. The hydrant which we had before us commended itself as the best. The cost of the hydrant is, in the first instance, 5 *l.* or 6 *l.*, but when you have to make double valves and sluice valves, that adds very much to the expense. Then the valves are to be rather better constructed than usual.

519. As I understand, your committee considered the cases of other towns; did they take the evidence of an engineer like Mr. Berrey, who has laid down the system in Manchester?—I think we had reports from all of them.

520. And still, notwithstanding this cost, which is of course a serious one, you believe that it would be advantageous, and that the cost would be repaid by the greater protection you would obtain under it for the whole of the town?—Yes.

521. May I ask where were the experiments made that you tried those hydrants with?—Against the blank wall of the Congregational Memorial Hall in Farringdon-street.

522. Would the 75 feet which you said you obtained be sufficient for all those new buildings which are being erected in the City?—For the majority of them.

523. Colonel Fraser stated in his evidence that the fault of the present steam engines was that they did not reach the highest floors of some of your buildings?—That is so.

524. Do you think your hose, with the jet which you say you can obtain, would do that?—I think it would do that more efficiently than the engines do at present, and when we get an increased pressure it will, of course, be still more efficient.

525. Have you any regulations in the City limiting the height of new houses?—I think not.

526. Is there any other point which you would wish to place before the Committee with regard to this matter, from your knowledge of what has been done in the City?—I think not.

527. Sir

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527. Sir *James M'Garel-Hogg.*] What is the area of the City?—About a square mile.

528. And the rest of the metropolis is about 120 square miles, is it not?—I believe so; it is extending daily.

529. Then if it costs you for one square mile 30,000*l.* to do it properly, do not you think it would cost the metropolis a pretty heavy sum?—No doubt.

530. Do you think the other part of the metropolis would be justified in incurring that expense without having a constant supply of water?—Certainly not; without a constant supply hydrants would be useless.

531. The pressure given by the New River Company is very good indeed, is it not?—Yes.

532. And it is going to be better?—Yes.

533. In fact you are in an exceptionally good position?—We are.

534. And also in regard to raising funds you are in an exceptionally good position?—Yes; I think we expend our funds liberally.

535. Did you give the company notice when you made the experiment that you were going to do so?—We did in the first instance, but not in the second.

536. Did you find any variation in the pressure between the first time and the second time?—No.

537. I think you stated that it was a pressure of from 38 to 40 lbs.?—Yes.

538. You found the pressure great, did you not?—Yes, we did.

539. Was it a continuous pressure?—Yes.

540. Could you have gone on for an hour?—We did. We had hydrants from different makers, and we placed them all down and tried each hydrant.

541. Which company furnishes the east of London with water?—The East London Waterworks Company.

542. And their pressure would be practically useless?—Yes.

543. You would not advocate placing a hydrant near the door of each house unless there were constant high pressure?—It would be perfectly useless to do so, because the water would run into the streets simply without being effective for the purpose of putting out fires.

544. Before adopting the system, did you issue advertisements to get the best sort of hydrant?—We did.

545. What is the name of the one you have adopted?—The one we have adopted is "Simpson's." I do not say that we shall adopt those hydrants throughout the City.

546. Are not some of your hydrants combinations; those upon the Viaduct, for example?—Those hydrants belong to the Commissioners of Sewers, and have not yet come into the possession of the corporation, but they have been offered to us, and I have no doubt we shall accept them.

547. Then after having gone into the matter thoroughly and carefully, and had advertisements issued, you think it is more economical to put down a hydrant which will cost 10*l.* by itself, besides the extra work, which will come to 15*l.* more, than to put down a cheaper one at 3*l.* or 4*l.*?—Yes; the hydrant we have adopted would, with disc valves, be much less costly than with sluice valves, but we are desirous of having the very best supply possible; the sluice valve gives you a large current of water, whereas the disc valve impedes the flow; that makes a considerable difference in the cost.

548. With those hydrants you would not like to leave the City of London without the protection of the fire engines?—Certainly not; but I think the hydrants would be the means of preventing the extensive conflagrations which we do have occasionally.

549. If there is an immediate application of water?—Yes.

550. How near are they to be?—Those which we have placed at present are about 80 yards apart.

551. Do you place the hydrants nearer in the streets where there are high warehouses?—No, we have not made any difference; but each hydrant is double, so that there are two hydrants to each place, and we could put a double hose to each hydrant.

552. Did you ever try any experiments at night with those hydrants without giving notice to the water company?—No, we did not.

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553. Both your experiments were in the day-time?—They were for the purpose of testing the efficiency of the hydrants, and there was considerable difference between one hydrant and another with the same pressure, a difference of 10 feet; the disc valves were all inferior to the sluice valves.

554. Sir *Henry Peek.*] The City intends practically to be under constant pressure?—Yes, under constant pressure; of course, wherever we place branches for hydrants we take care that we are in connection with mains that are constantly charged.

555. I think you stated that, so far, you had done one of the six police districts in the City?—We have not completed it; but the greatest number of branches which have been laid happened to be in a certain district, and we proposed that one district shall be completed, and, when it is completed, to confer with Colonel Fraser to drill the men in the use of the hydrants; we think that that would be very much better than to take all the area at once, and ask for the whole of the police to be drilled.

556. But your intention is to have all the City which is supplied by the New River Company under constant pressure, and all the police drilled as firemen?—The Corporation having admitted the principle, I think we may rest perfectly assured that they will continue the good work. There has been no resolution to the effect that hydrants shall be laid down throughout the City, but having admitted the principle, and having seen that it would be very advantageous for the citizens generally, I, in my own mind, should not have the slightest hesitation in saying that the principle will be carried out in its entirety.

557. Then what would become of those parts of the City which are supplied by the East London Company?—Those parts are very small, but the East London Company must be coerced into giving high pressure; of course we cannot ourselves control the East London Company.

558. I suppose when you have got these hydrants fully supplied, that will do away with the necessity of turncocks altogether?—It will do away with the necessity of them, but we have no control over the turncocks, because they are virtually for the purpose of turning the water on at the various establishments, but they are also called for the purpose of pulling up fire-plugs for extinguishing fire.

559. But you have had a case where there were two turncocks ill and one absent, and had to go to a fourth before you could find one?—Having hydrants, with constant pressure, will really do away with the necessity for their services. Engines have arrived and been unable to get water, whereas when the hydrants are there they will be able to get as much water as they require.

560. Do you think it would tend to the public advantage that the fire brigade should be part and parcel of the police?—I do not say that.

561. But if you are going to drill all your policemen as firemen, does not it come to that?—I do not think so; the police would be only there as auxiliaries to the fire brigade, and when the fire brigade came they would, of course, take charge of the fire; the police have quite enough to do to keep order, and to keep the place perfectly clear of the mob. When a fire breaks out, the policeman, as a rule, has the first notice; he springs his rattle, and he would be drilled into the use of the hose and the hydrant, and he could immediately apply it, and then notice would be given to every fire station, both within the City and also without, if necessary, and they would come as soon as possible; by that time the fire might be put out by the aid of the policeman.

562. Supposing the City were fully supplied with hydrants, would you say by all means keep the fire brigade and the police as distinct forces?—Certainly. To make the fire brigade and the police one body, would necessitate a complete revolution in the dress of the police, because a policeman, clothed as he is, is most inefficient as an active fireman; he would do very well for using the hydrant, but a fireman is expected to have ladders, and mount them, and to go into every hole and corner, which a policeman could not do as he is now clothed.

563. You have heard that Captain Shaw estimated that it would require 100,000 hydrants to protect London?—Yes.

564. Do you think that your hydrants, at 25*l.* a piece, would be the most economical?—If they are more efficient of course they would be.

565. Did you not say that your hydrants were also adapted for watering the

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streets?—Yes; you must remember that the cost of the hydrants proper is about 5*l.*

566. You stated that it was 10*l.*?—There is the placing of the hydrant, and there is the extra sluice valve for shutting in case of repair, and a variety of other things, but if you take the hydrant itself, without the box, and without the various appliances, it comes to much less than 10*l.*, say from 4*l.* to 5*l.*; that is the estimate that we have had, and if any persons have put forward the statement that the cost of a hydrant was 2*l.* or 3*l.*, without giving any idea of the actual expense connected therewith, it is a false impression. We say that a hydrant in its most efficient condition for all working purposes, would cost from 20*l.* to 30*l.* altogether. The hydrant itself you may put down at a cost of 5*l.*, but if you estimate it in that way you get a very wrong impression.

567. I understand Captain Shaw's hydrant, which, up to the present moment, so far as I can recollect, is the most expensive one we have had under consideration, worked out at 18*l.* 13*s.*, everything included, but you say the City hydrants will cost nearly 30*l.*?—That is what we estimate the maximum will be; we always like to take sufficient margin when we go to the Court to ask for a sum of money to be laid out, and if we can spend 20,000*l.* instead of 30,000*l.* we would much rather do it.

568. Mr. *Onslow*,] Would you kindly look at those drawings of hydrants in the Appendix before us (*exhibiting the same to the Witness*); is the one which you have laid down shown in this Appendix?—No, ours are double; these are all single.

569. Supposing the Committee were to recommend that there should be high pressure constantly in London, and hydrants all over the metropolis, is it your opinion that those hydrants should be uniform?—No; that they should be uniform so far as the waterway is concerned, but there are so many details connected with them; I would recommend that no hydrant be put down unless there was a good waterway.

570. You do not think that there would be any necessity for laying down expensive hydrants like yours all over London?—I do not consider our hydrants are particularly expensive, if you take them as I have put them down. If you take the hydrant itself, and then the laying it down, and then the laying of branches to the mains, we estimate that the cost will be about what I have stated; but if you take individual hydrants, laid on to a main where there is constant pressure, without having to go to that expense, which we ought not have to bear, but which should be borne by the water companies, then it would materially lessen the cost.

571. The reason of your hydrants being so close to one another in the City of London, is on account of the value of the property there, is it not?—Yes.

572. Do you consider there is a necessity for the rest of London that these hydrants should be only 70 or 80 yards apart?—The rest of London is differently placed, but if the hydrants were further apart than we propose placing them, we do not think they would be so efficient as those that we are placing. It would certainly necessitate the use of engines, because if you had hydrants 150 yards apart, although each hydrant could be brought to bear in the middle of that distance, if you had sufficient length of hose, yet you would require a very considerable length of hose.

573. I presume it is the case that putting down a hydrant through an asphalte or wood pavement, is more expensive than through a stone pavement?—It is a little.

574. The Committee have had it in evidence that there is a material difference in the expense?—The only difference is that when we take up asphalte the Asphalte Company, who are being employed by us, require that it be filled in with concrete; there is that difference.

575. You cannot give us a calculation showing the difference?—No; the engineer will be better able to give you that information.

576. Have you any experience of the different water companies in London besides the New River Company?—I have had experience of no other company than the New River Company.

577. Have you ever considered the propriety of amalgamating all the water

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companies?—Yes; we have considered the propriety of the water companies being in the hands of a metropolitan authority.

578. What metropolitan authority?—An authority. We have had that under our consideration, I think, in connection with the Board of Works.

579. Will you kindly let us know, as chairman of the Gas and Water Committee of the Corporation, what conclusion you have come to?—The conclusion we have come to is, that it would be very much better that the control of the water should be out of the hands of private companies.

580. That it should be under the Metropolitan Board of Works?—I did not say that.

581. You have not yet come to that conclusion?—We have not yet come to that conclusion.

582. Have you ever gone into the question of expense?—Yes; we have had that under our consideration.

583. Did you frame any estimate?—I think the estimate was about 15,000,000 *l.* or 18,000,000 *l.* I think it would be a very profitable investment to the metropolis generally.

584. Does that include the New River Company?—I think so.

585. It includes them all?—I think so. It is a matter which I have not gone fully into, although it came under our notice. I think Sir James Hogg can tell you more about it than I can.

586. We have had evidence from Mr. Chadwick that the average dividend of the water companies in London was 7 per cent.?—Somewhere thereabouts. I think they are entitled to pay as much as 10 per cent.

587. Then I may take it from you, having gone into this question, that the dividend being 7 per cent., taking it all round, the maximum price of buying up all the water companies would be 18,000,000 *l.*?—I think that is about what it has been estimated at, but I was not prepared to be asked about that matter. I expected my examination would pertain to fire only.

588. *Chairman.*] Following that matter up, I suppose one of the considerations you have in view would be that, by amalgamating the companies you would practically diminish the expense of working, and also that you would be enabled to get the highest pressure that you have in any one of the companies?—Yes, but in addition to that we have taken the water supply of the metropolis and the City into consideration for other purposes than for fire; it is a very large question, and one that must be looked upon from a sanitary point of view.

589. That we are not able to go into here, but for the purposes we have to inquire into, the combination of the companies on the one hand would give you a greater pressure?—And uniform pressure.

590. And you could get the highest pressure available in any company?—Quite so.

591. There is another question which occurs to me with regard to the expense of your hydrants. Mr. Berrey's evidence before this Committee, as I stated, was very much below what you pointed out. Mr. Berrey is asked at Question 7384, "It has been represented to the Committee that hydrants would not be satisfactory for London, and that the cost would be very much in excess (as some of the witnesses have said, over 10 *l.* each), for placing them in London." To which he replied, "That must be a mistake altogether, or the matter must be under very bad management, if they cost anything like half that amount." And then at Question 7406, he is asked: "Supposing a single authority existed in London with a determination of carrying this out, you believe you might carry it out at a cost, to a certain extent, similar to that which you had to undergo in Manchester, with the like result of efficiency." To which he replies, "I think so; I do not see why it should not, if the matter were well managed; it entirely depends upon that." Still, notwithstanding that you adhere to your opinion that what has been done in Manchester at so much reduced a cost, is not applicable to the metropolis?—I am not satisfied that it has been done at such reduced cost. They simply say the cost of the hydrant. The cost of "Simpson's" hydrant simply is about 5 *l.*

592. Mr. Berrey states the cost of hydrants, in answer to Question 7379, at 30 *s.* each, and then he is asked: "That would include merely the placing of the box and the hydrant upon the main; it does not include the cost of the service pipe

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pipe to take it to the side of the street;" to which he replies: "It does not include the branch pipe, but only the hydrant proper attached to the main pipe;" and then he is asked at Question 7381, "And that you lay down in Manchester at a cost of about 30 *s.* each?" to which he replies: "We lay that down in Manchester at a cost of about 30 *s.* upon a new main, and for about 2 *l.* 15 *s.* upon an existing main, because the soil has to be excavated, and the existing main has to be broken, and, of course, there is a good deal of time lost under those circumstances. (*Q.*) Have you ever considered the question whether, looking at the metropolis, such a hydrant could be placed upon the mains of the metropolis for a similar cost? (*A.*) I believe so; the only difference is this, that I am informed that in some places the pressure is very light, and from the evidence we have had here to-day that appears to be so." Then he goes on to the question I first began with about the 10 *l.*, which, he says, must be a case of mismanagement if it is true?—I am very much obliged to you. We will go a little more into it, but I am perfectly certain we shall not have to go back upon our decision.

593. Mr. *Hankey.*] If those hydrants were fixed, you said they would be applicable for watering the streets when fully carried out?—Yes.

594. That would save all the expense of the carts and a great deal of the present expense of the watering?—It might save some of the expense of the water carts, but it would not save the necessity of having carts to remove the mud.

595. But all the expense of water carts would be saved, would it not?—No, I do not think that. What we propose more particularly is for the washing of the streets; the washing of the streets would be for the purpose of keeping them particularly clean; we keep them clean now, but we should keep them much cleaner.

596. Mr. *Hardcastle.*] You could not water with those pipes when the traffic was going on, I presume?—You can do so, if it is necessary.

Mr. *Francis Cranmer Penrose,* Architect, called in; and Examined.

597. *Chairman.*] I BELIEVE you have given great attention to the question of fire-proof construction?—I have given some attention to it.

598. And also to the question of security against fire?—I have.

599. Would you state what relation you bear to the City?—I am Surveyor to the fabric of St. Paul's Cathedral.

600. Considering this question of fire and its effect upon the City and the property in it, and considering also the reference which has been made to this Committee to investigate the means of providing better security in theatres and places of public amusement, have you looked into the matter from that point of view, and is there anything which you can suggest to the Committee?—I have not looked at it broadly upon that point, but still I think the experience gained in endeavouring to protect St. Paul's Cathedral from injury by fire may be applicable to the general subject. It is quite clear that no simple cast-iron construction has ever satisfactorily resisted fire. Whenever fire has been satisfactorily resisted it has been by some kind of construction, either of solid brickwork or where cement and plaster has been largely used. The method which I have applied partly to St. Paul's Cathedral is the invention of Mr. Philip Brannon, C.E., which was carried out for him by a company which I do not think is now at work, named Elsdon & Co. I believe he is entering into negotiations with another gentleman, Mr. Robinson, for carrying out his works; at any rate he will be able to explain that himself, but the method consists of this: On the surface that it is intended to construct to resist fire he places a network of iron wire in the first instance, and then upon that he places a cement of selenitic lime and the fibrous husk of the cocoanut; of course there was a method well known in our art of employing cow-dung mixed with lime in those parts of the plastering inside flues where fire has most to be resisted, and that has been found extremely efficacious; in fact it is the best we know. Mr. Brannon introduced cocoanut fibre in place

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of the small attenuated and chopped material which the cow naturally produces, and this gives a much greater tenacity to the material. Then another part of the operation is that he subjects the material so formed to great pressure by bringing a pressure to bear upon it which indurates it very much. By that means he has made a door no thicker than a wooden door, which is quite as strong, if not stronger, than a wooden door. I have seen one which he told me had been used in a stable, and had been kicked by a horse without any serious impression being made upon it. What I saw myself was a door of his manufacture put beside another ordinary framed door, and heaped with bricks until both showed signs of deflection, but the Brannon door certainly stood very decidedly more weight than the other door. They both recovered themselves upon the weight being removed, but this material, though not more than 1¼ inch thick, will resist an enormous power of fire. I have been in a house at Edmonton or Tottenham where he had a large fire of faggots on a floor built of his material, surrounded by partitions of the same sort, which was set on fire and made a roaring blaze. It burnt out the windows, which were iron casements, the iron twisting about like ribbons, but I stood against the partition, and I stood on the thin floor which served both as a floor and ceiling, but without feeling any more than a very gentle warmth. That experiment and the evidence of the strength of the material satisfied me that it was extremely valuable in case of fire; so that I think that part of our Cathedral, that is to say, part of the wooden framework of the dome which is protected, is safe from any of the ordinary fires which might be there generated; and I presume that the same method carried out more particularly with a view to it might be made effective even in the storage of cotton.

601. Do you think you could apply that to theatres and other buildings?—It could be applied to theatres perfectly. Any ordinary quantity of drapery or stage lumber might be burnt on one side of one of these partitions not thicker than that book with perfect impunity.

602. Without any risk of the building itself catching fire?—Without any risk of the building itself catching fire.

603. Is the Cathedral insured at present?—The Cathedral is insured at present to the extent of about 90,000 *l.*

604. I suppose the insurance has not been reduced in consequence of this material being used?—No, we have made no application on that ground.

605. How long have you been acquainted with this system?—I think it is about either four or five years that it has been known.

606. I suppose it has not been tried to your knowledge in any of these newly constructed theatres, has it?—No; I think I should have heard of it if it had been, but I have not heard of it.

607. But as a security and protection against fire in any place likely to expose many people to danger, it would be, in your opinion, a great additional security?—I would almost venture to say that it would be perfectly secure if it were done in a sufficiently solid manner.

608. Can you give the Committee the cost of this material?—It cost us about 7 *s.* 6 *d.* a square yard. I do not believe that the company gained anything by it, but that was very much from their mismanagement rather than the costliness of the material itself.

609. And therefore it is a very reasonable material to use?—Extremely so. The whole cost of protecting that segment of St. Paul's Cathedral which serves as the access to the top through the timber-work of the dome was less than 1,000 *l.*

610. And in protecting the approaches and galleries of theatres, it would, from its power of resisting heat, give a very much greater security than at present exists?—I should think it would give as great security as a brick arch sufficiently solid to dispense with iron ribs.

611. Up to the present time I suppose a brick arched building is the best protection against fire?—Yes; but its power of resistance is impaired when cast-iron is used in its construction.

612. Or stone. Captain Shaw's evidence is that nothing is more insecure than iron and stone together?—Quite so. Some kinds of stone will resist fire very well, but very few.

613. This material would be even equal to a brick arch?—I think so.

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614. Is there any other suggestion which you would wish to make with regard to the question of giving greater security to buildings against fire?—It is a very complicated question. Of course making access and egress easy is a matter of great moment, but for really protecting the ingress and exit I should have the very greatest confidence in this invention of Mr. Brannon's. It should be observed that it requires to be used with great care, because parts of the work are soon concealed from the eye, and may be very bad.

615. The material requires watching while it is being constructed?—It does.

616. It has not, as I understand you, been used at all largely?—It has not been used largely.

617. Therefore there has not been much practical experience in the working of it?—No; but the experiment of the fire which had been made purposely to test it in a small way was complete; a great many people have witnessed the experiment; it has been done several times over in Edmonton.

618. Did I understand you to say that you were in the building yourself?—In the building; both in the passage contiguous to the fire and over the room and on the top of the fire.

619. The fire was burning underneath you, and you were protected by this flooring, and the strength of the fire was sufficient to twist the iron of the windows in the manner you have described?—Quite so.

620. And notwithstanding that the floor above was just slightly warm?—Quite so.

621. That would be practically a security, even in large warehouses, against the fire spreading from one floor to another?—Of course when a fire takes hold of a very large quantity of material we do not know what to do to prevent its spreading.

622. Was the floor of the same thickness as you described the door to have been?—No; it was probably six or seven inches thick.

623. How do they lay it in constructing a floor of that sort?—It is on the system of iron ribs, but the material itself helps the adhesion of the iron; the iron itself is put together in an extremely inexpensive manner, because there are no rivettings or expensive joints required; you may suppose a tie rod and an arch rod combined; instead of being brought together with a web of iron and rivetted as is the usual way to the girders, as one sees everywhere, these are connected one with another by wire twisted backwards and forwards; that is embedded in the whole mass of concrete which forms the floor, so that they cannot move in themselves; they are sealed together.

624. It is practically a species of concrete?—It is practically a species of concrete strengthened with iron ribs, but the concrete itself forges, as it were, the ribs together.

625. The concrete itself protects the ribs from the heat, and prevents them from being twisted, as they would be if they were exposed?—Quite so.

626. It is laid somewhat the same way as you lay an ordinary concrete floor?—Quite so; except that in laying a concrete floor the ribs are prepared in a solid manner, being ribbed and rivetted and flanged, but in this it is done in a simpler manner.

627. In this case it is worked into the mass of the concrete?—Quite so.

628. Mr. *Onslow.*] One of the suggestions of the coroner's inquest upon the bodies of those who were burnt in the fire at the Brooklyn Theatre, was that in the erection of any building intended for theatrical purposes there should be a wall dividing the theatre from the auditorium; do you think it quite feasible for that wall to be built of your material?—Quite so.

629. What is the name of this material?—Mr. Brannan calls it "stone felt."

630. Do I understand you to mean that the wall itself should be built of this material, or that the wall should be built of brick and overlaid with this material?—Where he uses brick he does not use this material; he considers that brickwork is equally good, but if brickwork is not used he would construct the work of a ribbing of iron wire clothed with a kind of concrete.

631. How thick would a wall be built of this material?—In the case of a wall it would be thicker than in the case of the door I mentioned, but not very much thicker; they would build a wall of very considerable extent not more than six inches thick.

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632. Would that be sufficiently strong to hold up the roof of a theatre?—I do not wish to give a positive answer to that question as to what would be the thickness required to support the roof, but I have seen walls of that thickness which seemed to have a great deal of strength.

633. *Chairman.*] Can you give the relative strength as between gravel or pebble concrete and this new material?—This must be vastly stronger.

634. I ask you that because the tests concrete has stood are very marvellous?—I should think that this would have twice the strength of a concrete wall. I am speaking now only of my own impression, that I should apprehend that any wall which would be required for a theatre need not be more than a foot thick.

635. Mr. *Onslow.*] I presume you could use this material in the present buildings, that is to say, you might lay this over a wood floor?—Certainly, that is done in our present work at St. Paul's. The landings are wooden floors coated on the top, bottom, and edges with this material.

636. From your experience would you say that stone staircases were worse than wood to put into theatres?—I have heard that said. I should say very decidedly worse than wood overlaid with this material.

637. Is this cement impervious to wet?—I think it may be. I have never tried it in that way. I have heard Mr. Brannon say that he considered it so; and the cottage which I went to see where this material was experimented upon was covered with a flat roof of this material.

638. You think it is quite possible to lay down staircases and balusters with this concrete?—It would not lend itself to the forming of balusters, but it would do for closed parapets.

639. I daresay you may have seen other appliances of this sort for protection from fire. I suppose one may gather from your evidence that this is the best of all you have seen?—I think it is the best of all I have seen; it certainly was the only one applicable for the purpose that I looked at it for.

640. *Chairman.*] Have you ever tried the extent to which it will carry its own weight taken out from a given point?—No; I have not tried that.

641. That is the way they test concrete?—I know that Mr. Brannon has the greatest faith in its tenacity, but I have never seen any experiments of that kind.

642. Sir *Henry Peek.*] You said that the material cost 7 *s.* 6 *d.* a square yard; how thick would that be?—The material was about 1½ inch thick.

643. How high can you get water at St. Paul's Cathedral?—We fill a cistern at about 70 feet above the roadway, and there is some pressure left in the pipe.

644. Do you pump it up higher than that?—We could do so, but the store of water which we have for the upper works is drawn from above; we gather the rain.

645. Then in a long dry season you have got none, I presume?—We never lose more than a very little by evaporation in the cisterns in which we store the water.

646. How high is that cistern?—About 320 feet above the floor.

647. What quantity of water have you at that immense height?—We gather the water round the dome in eight large cisterns, and pump the water from thence to those top cisterns, but the store has never failed at all in any season.

648. You have always had an ample store of water from the rain?—We have always our cisterns full, which would give a very considerable supply in case of accident.

649. Do you keep any firemen at St. Paul's Cathedral?—Not as regular firemen; we have a night watchman whose duty it would be to report any fire.

650. But supposing at the height of 200 feet there was an alarm of fire?—Some of our workmen are instructed what to do; and they would run to Watling-street for further assistance.

651. How many watchmen have you at night?—We have one man at night, but there are perhaps eight or nine people during working hours there.

652. *Chairman.*] Practically you are in the same position as other buildings;

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ings; you are dependent upon the fire brigade for material assistance?—Yes.

653. Sir *Henry Peek.*] Have you instructed the Watling-street people how to make use of your appliances?—We have.

654. Sir *Andrew Lusk.*] You say it is four years since this invention came forward before the public?—Yes; four or five years.

655. Do you know why it has not been adopted in a larger degree than it has?—I believe that it has been owing to Mr. Brannon's difficulty in forming a company, but I believe Mr. Robinson is now in treaty with him for extending the business.

656. Has it been applied to many places?—It has not been applied to many.

657. Because from what you say it appears to me a feasible thing, but still the public have not adopted it?—There are other instances of that.

658. It is not in reference to this that you speak about the theatres?—Quite so. I have no experience about theatres.

659. Did you say it was equally as good as brickwork?—It is stronger than its equivalent of brickwork.

660. But you say that in applying it to theatres it would be as good as a wall or an arch of brickwork?—It would be stronger than brickwork. I do not think it would resist fire better than brickwork.

661. Suppose you could have the alternative to take brickwork, or this material to do any particular thing, which would be the best?—It depends upon so many circumstances that I cannot answer the question in that form. There is the question of the foundation and the size of the openings required; this would be lighter and more easily managed than brickwork.

662. And therefore more convenient for high elevated positions?—Yes, but still if there is sufficient foundation, and a sufficient mass of brickwork, I do not suppose that one is better than the other.

663. Mr. *Forsyth.*] Could you build the walls and floors of a house entirely of this "stone felt"?—Yes.

664. And now as comparing the expense of this "stone felt" with ordinary concrete, which is very much in use now, what would be the expense of a cottage or a house built with the "stone felt"?—The "stone felt" would cost the most.

665. What per-centage more do you think?—I have no experience which enables me to say; perhaps as much again, but I would rather not go into that.

666. As compared with brick what would the expense be?—About the same as brickwork I think. A floor would cost a trifle more than a wooden floor, but then it would be fire-proof.

667. Has the material ever been applied to any public buildings yet?—I think not except St. Paul's Cathedral.

Mr. *Arthur Cates*, called in; and Examined.

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668. *Chairman.*] You are an Architect, I believe?—I am.

669. And as such you have had some experience in the metropolis in the way of applying a system of hydrants, have you not?—I have laid down a system of hydrants in the Inner Temple.

670. You laid down, did you not, the system of hydrants which has already been referred to before this Committee?—I did so.

671. That was recently I believe?—It was in the autumn of 1875.

672. First, are you able to state what the water company is that supplies that part of the town?—The New River Company supplies it.

673. They give you a higher pressure than some of the other companies, as we are told?—I believe the pressure is higher than that of some other companies.

674. When you applied those hydrants had you previously made any experiments with reference to the pressure of the water, and the heights of the jets you could get?—I had no means of making experiments of that kind, but I

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communicated with Mr. Muir, the engineer of the company, and upon the information he gave me I based my plan.

675. Will you describe that plan to the Committee?—I have brought a plan of the Temple, showing the whole system of mains, and the position of the hydrants.

676. Had you to establish new mains in this instance?—We had to establish entirely new mains, and thus the establishment of the hydrants was simply incidental to the formation of a new system of water supply for the Temple. Previously to the autumn of 1875 the Temple was supplied by a lead main about 3½ inches in diameter, which was exceedingly defective, and continually out of repair; it was so tortuous and defective that it diminished the pressure, and altogether the water supply was in a very unsatisfactory condition. The Temple, occupying a very peculiar position as regards its accesses, there being only two carriage entrances, one from Middle Temple-lane and the other from Whitefriars, was not approached so readily by the ordinary fire engines as it would be if it were in the main street. The courts and passages were very narrow, and the main supplied water in such small quantities that in case of an outbreak of fire it would have been entirely inefficient.

677. That was the system that you found there?—Yes, a system which had been in existence perhaps for 100 years. The main was a very old one. I reported to the Benchers upon the matter, and I represented that as the old main must be relaid, advantage should be taken of the opportunity to provide better protection for the property of the society by the use of hydrants. In the result I was authorised to relay the whole system, and carry out my recommendations. I laid down a main from the 12-inch New River main in Fleet-street to the 7-inch main in Whitefriars, connecting Fleet-street with the Whitefriars main, so that in case of the main in Fleet-street being shut off for repairs I receive my supply from Whitefriars, and from that central main I laid down branches.

678. What was the size of the main you laid down?—A 7-inch main, the same as in Whitefriars; from that I laid down a 6-inch branch along Crown Office-row, and from both branches to the different courts and passages.

679. And upon which of those mains did you place the hydrants?—None of the hydrants are placed directly upon mains; they are all upon branches from the mains.

680. What are the sizes of the branches?—The branches vary in size; those to the hydrants are three inches, and throughout the Inner Temple there are 37 external hydrants.

681. At what distance apart?—They have not been regulated by distances so much as by the peculiar circumstances of each locality; the distances do not exceed about 150 feet; and where desirable for the protection of the church, the hall, and the library, in some cases are less.

682. Are those the single or the double hydrants which we have heard spoken of to-day by the gentleman representing the Corporation of the City of London?—They are single hydrants fixed in boxes, which are flush with the level of the pavement or the road. The stand pipes, which are provided to be screwed on to them for the fixing on of the hose, have double outlets, so that two branches may be fixed.

683. After they were fixed did you test them as to height?—Yes, I did so.

684. What height did you get with both hoses attached?—I tested every one of the hydrants, and I may, perhaps, take the instance of Figtree-court, which is in a very confined situation, surrounded by high buildings.

685. Is that the highest, or the average height of the level?—It is about the average level; it is only approached by exceedingly narrow passages, so narrow that the ordinary hose reels cannot pass, and those in use at the Temple were therefore made purposely of less width than usual; engines could only approach by King's Bench Walk and the Terrace, or Middle Temple-lane, and therefore there must be a considerable length of hose from any fire-engine to reach a fire in that locality. I fixed one hydrant in the centre of the court, and upon the stand-post which was screwed on there, I put two lengths of hose with two branches.

686. What length of hose?—Each of them was the ordinary 40-feet length; the jet was thrown clear above the parapet of the highest building of Crown

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Crown Office-row, the height of which exceeds 60 feet above the level of the pavement.

687. Did you test them on a larger scale to see whether your supply of water was continuous?—I did so, in this instance; I first put on one branch, I then added another, and I then brought from Crown Office Row, from the same main which serves Figtree Court, two other branches, and the jets given by each of those four, when the four were in action, were practically of the same height and apparently the same force as when only one was given.

688. Notwithstanding that some of them had a greater length of hose attached?—Some of them had a greater length of hose attached, namely, those which were brought from Crown Office Row; they would have in one case three lengths, making 120 feet, and in the other case two lengths, making 80 feet.

689. It has been stated in evidence here that when you get on not a very high pressure a very long length of hose, the friction of the length of the hose itself reduces the force of the water; you stated that you did not find that there was any reduction owing to the length of the hose?—The pressure appears to have been sufficient to prevent any perceptible difference, because the longer lengths of hose were attached more directly to the larger main, thus equalising the conditions.

690. Although the pressure was only the ordinary pressure of the New River Company?—Yes.

691. Now was your experiment made with any notice to the company before you made it, or did you take it in the ordinary way, the ordinary daily supply which existed?—Upon that occasion notice had been given to the company, and their inspector attended.

692. Was there any deficiency in the pressure at the time the experiment was being made?—Not in any way. After that experiment, I thought it would be satisfactory to ascertain whether any difference would be made in the jet by putting several branches on the same main, and in front of the library, on the terrace, there are five hydrants. I put one length of hose, with a branch, to each of them, and directed them to the library, and to Paper Buildings, and I found there was no perceptible difference.

693. It was a continuous supply, which you could depend upon?—It was a continuous supply, which I could depend upon.

694. That after having been at work a short time, there was no apparent falling off in the pressure?—Certainly not, because on that occasion I tested the whole of those hydrants. I began at one end of the Inn, early in the morning, and tested each of them by fixing one or more lengths of hose and proving the jet. This occupied a considerable time, and there was no apparent difference in the pressure between those first tried and the last.

695. Was that also at a time when the company were aware that you were at work?—It was.

696. Have any experiments been made to test the working subsequently to that?—Yes, I have made several since, and the hydrants are tested periodically to ascertain they are in good order, and the pressure of water satisfactory.

697. All made with the knowledge of the company?—No, without the knowledge either of the men employed in the inn or of the company, and I have found the results invariably satisfactory; I may say identical.

698. Therefore you infer from that, that where you have the pressure which you have under the New River Company at present, and where you can connect your hydrants in the way you have done, with mains which have constant supply, you do get a satisfactory result in the use of hydrants?—The result obtained in the Temple is highly satisfactory, and it fully realises all the anticipations I had formed of it.

699. Now, with reference to the cost; can you tell the Committee what has been the cost of laying down the hydrants?—I cannot tell you the cost incurred by adopting hydrants as separate from the whole cost of the work. The work has been not simply putting down the hydrants, but it has been the remodelling of the whole water supply.

700. I suppose you can tell the Committee what the actual hydrant itself cost. The Committee have had it in evidence to-day that the City proposed to put down a hydrant, simple in itself, costing 10 *l.*; we have Mr. Berrey's evi-

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dence from Manchester, stating that these hydrants have been put down at less cost; I wish to know whether you can separate from your general calculations, with reference to expenses, what the hydrants each individually cost?—The hydrant which I adopted here was made according to a special pattern, so as to provide a fuller and clearer water-way than I found was the case with the hydrants which were ordinarily sold; the cost of each fixed complete was 3 *l.* 2 *s.* 6 *d.*

701. £. 3. 2 *s.* 6 *d.* was the cost of each hydrant fixed complete?—The hydrant fixed on to the seating of the branch from the main brought up to receive it.

702. That does not include the cost of the boxes?—It does not include the cost of the boxes. The boxes, and the brickwork to form the foundation of the boxes, would be about 1 *l.* 0 *s.* 9 *d.*; that was the average cost, taking them all round.

703. That makes 4 *l.* 3 *s.* 3 *d.*?—Yes; so that you may take it that where the flange seating of the branch from the main has been brought up to the proper level to receive the hydrant, the cost of the hydrant, including the cock box to protect it, fixed complete, was 4 *l.* 3 *s.* 3 *d.*, exclusive of paving works.

704. And with the results of efficiency which you describe?—They were perfectly satisfactory.

705. Does that include sluice-valves to screw down in case of repair?—It is simply the hydrant itself, without any sluice-valves or stop-cocks to separate it from the main.

706. Have you any system by which you do separate them?—I have not separated those hydrants individually from the mains, because I have adopted a system of stop-cocks and sluice-valves by which I can cut off the service into several sections, so that if repair is needed in one part of the supply the rest of the Inn is not interfered with.

707. What you represent is, that it is not necessary to go to an additional expense in every instance, but that you can do it by treating it in sections more economically?—In this case it was possible to do it more economically by treating it in sections; but the Temple occupies a peculiar position, as the control of the water supply within our gates is within our charge, and we have no turncocks to apply to, our own men attending to the water supply.

708. Are you able to speak at all as to the amount of mains that exist similarly charged to those from which you have brought your own pipes?—I am not.

709. But, from your experience of the Temple, you believe that, even with the existing water supply of the New River Company, and with its pressure, you may get a system established for protection against fire infinitely greater than what the present system in London generally affords, and at a cost such as you have described?—Certainly. My object in carrying out this plan was to provide such appliances that, upon the outbreak of fire, the servants of the society should be able at once, by simple means, to attack it at its outbreak.

710. Of course one of the principal advantages of hydrants is, that if your hose is ready, almost anybody can apply it?—Yes; in this case I have two places of deposit; two engine-houses where hose-reels and all necessary appliances are kept. The head porter and the other porters have the keys of those stores, and are acquainted with the manner in which the appliances should be used.

711. But there is nothing to prevent the police, or anybody in London, if the system were generally applied in London, using it with material advantage to the diminution of fire?—Certainly not, if with the hydrants, or near at hand, you have the hose, the branch pipes, and other appliances which are necessary.

712. You are of opinion that all those appliances should be so placed that they can be got at by whoever may be able first to turn the water upon the fire?—Quite so; to make effectual use of a hydrant of this description which I have adopted, this cheap hydrant, the first thing necessary is the copper standpost; then you require the hose and branches.

713. But all those take a very short time, I suppose, to apply?—They take a very short time to apply if they are at hand.

714. I am assuming that they are all at hand; in that case it only requires a few seconds to put your hydrant into motion?—Quite so; in this case I have the

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the places where they are kept close at hand, and they can be put into use in a few moments' time.

715. In a system of hydrants for use in a town, it is an absolute necessity that all these appliances should form part of it?—Quite so.

716. We may gather then from your experience that first the cost need not be so great as has been represented to the Committee, and next, that you can use hydrants with efficiency even on the existing supply which is given in many parts of the town?—Certainly.

717. Mr. *Forsyth.*] How many hydrants have you got in the Inner Temple?—Thirty-seven external, and nine internal hydrants.

718. There is one on the library staircase, is there not?—There is; also in the hall: the hall is an important structure with an open timber roof, and I have placed three hydrants, all commanding it completely. I took the opportunity of proving them, and I found that the internal hydrants threw the water up against the ridge of the open roof with very great force; that ridge is 56 feet above the floor line of the hall, which is considerably above the level of the paving.

719. Supposing a fire to break out suddenly in the middle of the night in the Inner Temple, who would be the persons who would be able to use these hydrants at once for the purpose of extinguishing the fire?—The head porter and his under-porters.

720. Are they trained for the purpose?—The training required is but little.

721. But have they ever been exercised in the use of those hydrants at all?—They have. Before I gave them over, I took all the men and instructed them as to what should be done, and the proper course to be taken; and all the trials have been made solely with the porters and labourers employed by the Society, without any assistance from specially-trained men.

722. The last fire in the Temple was at the south end of King's Bench Walk, some years ago, was it not?—There has been a small fire since then.

723. In the Middle Temple we used to have fire engines; are those fire engines there now?—Yes.

724. Why do we keep them now?—Although at present we have sufficient pressure, and everything is perfectly satisfactory, we have no guarantee that that pressure will be maintained, or the mains may be under repair, and accidents may occur which would reduce the pressure, and in the case of fire, if we relied simply upon those hydrants, we might, at any time, be in default.

725. You would call them a reserve precaution?—Yes, only a reserve as extra precaution for the present.

726. You tried an experiment with regard to the power of the jets; was not there an experiment tried as to the height at the church?—Yes, the hydrants round the church were brought into use.

727. Was not a jet thrown right over the cone at the highest point of the round part of the church?—I was not there upon that occasion.

728. But that is much higher than the spot we have been talking about?—When we were trying these experiments upon the terrace, the jet was thrown considerably above the highest pinnacle of the oriel window, which is 68 feet above the level of the terrace paving, when the five jets were in action at the same time.

729. Do you remember the fire in King's Bench Walk which I referred to?—Yes.

730. Do you not know that the land engines which were brought there did very little good, and that the fire was not really extinguished until the steam-engine from the Thames came into operation, when it was extinguished almost immediately?—I believe that was the case.

731. Sir *James M'Garel-Hogg.*] You are aware that the circumstances of the Temple are peculiar, and that what is applicable to the Temple would not be applicable to the rest of the metropolis?—Not as a matter of course.

732. In the case of fire would you trust the Temple to hydrants alone?—Certainly, for attacking fire at its outbreak, if the existing pressure of water could be maintained.

733. Would the porters and people trust to hydrants, or would they immediately

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diately send a messenger off to the nearest fire-brigade station?—Their duty would be to send a messenger off to the nearest fire-brigade station immediately, and themselves to bring the hydrants into use at once.

734. But they would use the hydrants as auxiliaries?—They would use the hydrants to attack the fire, and with their aid would, I hope, have extinguished the fire before the men of the brigade arrived.

735. But still you would not like to trust to the hydrants entirely?—Certainly, but if left in the hands of our own men, with the intention of excluding the services of the fire brigade, and if the assistance of the men of the brigade was to be excluded, it would be necessary that we should have a force of trained men of our own on the spot.

736. With regard to the cost of the hydrants in the Temple, you have peculiar facilities for making your own arrangements, but if you had hydrants elsewhere you would be obliged to have appliances to stop off the main, would you not?—It would depend entirely upon the mains. I have here arranged the mains in such manner as to provide for cutting off sections by sluice valves without interfering with the general supply, so that I have saved the cost of a separate sluice-valve to each hydrant, which might otherwise have been necessary.

737. You would not, in putting down hydrants, be able to alter the mains in the way you did it in the Temple?—In the case of the Temple it was a necessity that new mains should be laid, and I took advantage of that to lay down the best system I could find applicable to the circumstances.

738. You told us that you could not always trust to the pressure which you found existing in the New River main?—I have no reason to believe that the pressure would vary, or that any extraordinary pressure was provided upon the occasion which I mentioned, but there is no obligation upon the part of the company, that I am aware of, to retain that pressure, and as incidents might arise which would render the pressure deficient, it was essential that we should preserve our engines to meet a case of that kind. There might be two or three large fires occurring at the same time in the City, and the pressure might be directed to those fires in particular, and taken away from us, and if we were left only to our hydrants we might find ourselves in a position of considerable difficulty.

739. Could you tell me the name of the person who made that hydrant?—Guest and Chrimes.

740. Is that the same which we have in our Appendix?—It is not the ordinary stock pattern; it was one made specially to get a full water way.

741. Sir *Henry Peek.*] Do I understand you to say that two and three lengths of hose gave exactly the same maximum result?—I did not measure it exactly, but I did not perceive any difference; there was practically no perceptible difference under the circumstances of that trial.

742. That is as between 80 and 120 feet of hose?—Quite so.

743. In the event of a fire in the Temple at night the porter would run to the fire-brigade station for men, and not for engines?—The duty of the porter would be to send a messenger to the fire-brigade station to give notice of the fire, then at once to collect the under-porters and others about the place, and they would at once apply the hose, and I hope extinguish any fire before the men of the brigade reached the spot.

744. You yourself have confidence enough in the hydrants to think that in the majority of cases the engine would be unnecessary?—I should hope, and am confident, that in the majority of cases the supply from the hydrants directed by our own men would be sufficient to extinguish a fire at its outbreak.

745. Let me refer you to Question 6013: "But that has been attained within the Temple, I understand, by their going to the expense of laying down a fresh main for fire purposes? (*A.*) They have laid down a main for fire purposes much larger than they would have found necessary for their domestic supply"?—I should not have laid down so large a main as seven inches for ordinary service, if I had not contemplated the fixing of the hydrants.

746. Mr. *Onslow.*] Do you know the class of hydrants which are now being put down in the City?—I do not.

747. Supposing it were agreed to put down hydrants all over London, do you think the class of hydrants you have in the Temple would be the best?—I have not considered that question, but perhaps they would be better as fixed posts.

748. Do

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748. Do you use the hydrants in the Temple for watering purposes?—No, we do not, we have other arrangements of a similar nature, but do not use the fire hydrants.

749. Are they practicable for that purpose?—Perfectly so; but if used for watering purposes we should be subject to a charge for their use.

750. Do I understand you to say that the hydrants which you have in the Temple now, provided you had a proper supply of water, would throw a jet as high as the highest house in the Temple?—They would throw it over the parapet of the highest building in the Temple.

751. Would that be sufficiently strong to throw a jet of water to the top of those high buildings which have been recently built in London?—I think not so as to produce a satisfactory effect, if the branches must be directed from the street level; it is very well as an experiment to test the pressure, to throw a jet of 60 or 70 feet, but the action of the wind upon a jet of that kind is very great. On a still day you get a very satisfactory effect, and upon a windy day your jet is of very little use, therefore I made further experiment by taking the hose on to the roof of the loftiest buildings. I took the hose up outside the building on to the roof of Paper Buildings, which is 60 feet from the level of the pavement, and I then found I got a very powerful jet of 25 or 30 feet, quite sufficient to deluge any fire at a considerable distance.

752. What length of hose would there have been?—I think there were three lengths of hose in that case; that is 120 feet. On another occasion I took the hose inside up a staircase in King's Bench Walk, and then out on to and along the roofs, with an equally satisfactory result. There were five lengths of hose used, 200 feet; the hose was also attached to a hydrant on the library roof, and by it the roof of the hall was completely commanded; and by these experiments I was satisfied that with the existing pressure and our own appliances every portion of the buildings under my charge could be efficiently protected.

753. I suppose, like everything else, improvements are being yearly made in hydrants?—I believe a great deal of attention has been paid to them, and improvements have been made.

754. You have no means of knowing whether those hydrants which are being put down in the City are more powerful than the ordinary hydrants?—It is not a question of power at all; the hydrant is simply the means by which you connect your hose with the mains; there is no action on the part of the hydrant at all; the great principle you have to secure is that the waterway should be unobstructed and as large as possible.

755. I think we have it in evidence that the hydrants which were put down in the City would be able to throw water to the top of the highest buildings?—If the pressure of the water is sufficient. The hydrant itself is a mere passive means of communication, a mere conductor.

756. It is merely a means of keeping the pressure stopped up at a given point until you want to use it?—Quite so, and then giving the least possible obstruction to the water.

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Monday, 26th March 1877.

MEMBERS PRESENT:

Mr. Clifton.
Mr. Forsyth.
Mr. Hankey.
Mr. Hayter.
Mr. Herbert.
Sir James M'Garel-Hogg.
Mr. Kinnaird.
Sir Andrew Lusk.
Mr. M'Lagan.
Mr. Onslow.
Sir Henry Peek.
Mr. Ritchie.
Sir Henry Selwin-Ibbetson.
Marquis of Tavistock.
Mr. Young.

SIR HENRY SELWIN-IBBETSON, BART., IN THE CHAIR.

Lieutenant Colonel *William Haywood*, called in; and Examined.

Lieut. Colonel *W. Haywood.*

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757. *Chairman.*] You are an Engineer, I believe, employed by the City of London?—I am.

758. And Engineer to the Commissioners of Sewers?—I am.

759. Were you employed by the Gas and Water Committee of the Corporation of the City with respect to the hydrants which they have been considering?—I was.

760. I believe those hydrants laid down under the Holborn Valley Improvement Scheme were the first put down, were they not?—Yes; the Holborn Valley Improvements were carried out under my design; the Corporation there had to lay down both gas and water pipes for the various companies in lieu of those which they displaced, on the lines of thoroughfare which were destroyed, and the Corporation then placed hydrants throughout the whole line of streets, which were finished about six years ago.

761. Up to that time there had been none, I believe, fixed in London?—I believe those are the only streets in the metropolis which are fitted with fire hydrants throughout their length; I know of no others.

762. Since that time the Corporation have been engaged in laying down branches preparatory to putting down hydrants in the City, have they not?—Yes.

763. To a considerable extent?—Yes, to a considerable extent. I can give the Committee the lengths that are laid, and the times at which they were laid. In 1875 the Corporation laid 92 branches in 44 streets; in 1876, 92 branches in 35 streets; those together make 184 branches in 79 streets. In the present year the Corporation intend to lay 63 branches in 18 streets, and when those are laid there will be 247 branches ready for hydrants in the City of London.

764. Up to this time the Corporation have fixed no hydrants upon those branches, I believe?—They have not yet.

765. Can you give the distance that those branches have been laid apart preparatory to putting hydrants upon them?—Taking the mean of the whole City, they are about 60 yards apart.

766. The City contemplate putting down hydrants over the whole of their area, do they not?—I do not know that they have affirmed that; but considering what they have done, I should imagine that there was no probability of their ceasing their work.

767. What number of hydrants would it take to place the whole of the City area under that system?—According to my estimate the number actually needed will be 928 for the whole City, and if you deduct those which are on the line of the

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the Holborn Valley Improvements, where the hydrants are already erected and in use, it will leave about 900 for the whole of the City.

768. The whole of the City is supplied by the New River Company, is it not?—It is, with the exception of a very small portion of the eastern end of the City.

769. The New River Company supplying the hydrants on the Holborn Valley Improvements?—Yes, they supply the water.

770. Were the tests upon the Holborn Valley satisfactory with regard to the pressure as given by the New River Company?—Some two or three years ago, Captain Shaw told me he had tried the hydrants and found that they gave a 60-feet jet.

771. As a continuous jet?—Yes, an effective jet of 60 feet.

772. Did Captain Shaw tell you that that was with any particular length of hose?—I have not the particulars of that trial.

773. Merely that for practical purposes Captain Shaw thought they would give a 60-feet jet?—He found a 60-feet jet was given; that was probably with a working length of hose.

774. A 40-feet length?—More than that, I daresay; probably 80 feet.

775. Hydrants of different sorts have been tried in the City, and the Corporation have selected one which they propose to put up?—I must tell you that this matter is managed by what is termed the Gas and Water Committee of the Corporation, and part of its duties is delegated to a sub-committee; that sub-committee has arrived generally at an opinion as to which is the best hydrant, but it is not yet actually determined on.

776. The Committee understood from Mr. Shuter, who was examined on the last occasion, that to a certain extent it had been decided upon?—To that extent it had been decided upon, but no further. The committee of selection, so to speak, has expressed an opinion in favour of a particular hydrant, but the matter has gone no further than that; it has yet to be subjected to the approval of the larger committee; the committee in its entirety.

777. Can you state at all what the results of the experiments have been?—The results have not been made public, but I suppose this Committee has a right to inquire into all that has been done, and I will tell you generally what has been done. Firstly, I would say that I do not know what evidence has been already before the Committee on this point; if it has not been before the Committee, it would be desirable to tell them what the Corporation has done with respect to hydrants.

778. Will you kindly do so?—Firstly; I drew out a specification of conditions for tendering for hydrants, and the Corporation advertised for tenders and designs; 16 makers sent in 60 designs between them, and those designs were explained by 45 large sheets of drawings. These were considered by the committee, and they selected four makers of reputation to send in pattern hydrants. That was done, and with five pattern hydrants some experiments were made. Now with regard to those experiments they were as follows: they were taken in Farringdon-street.

779. That is at a low level?—That is at a somewhat low level of the City. One of the lowest levels of the City, certainly. The whole of the five pattern hydrants were tried in succession, under identically the same conditions; that is to say the same sized nozzles, and the same sized hose, and the same length of hose were employed. The pressure during the experiments varied from 42 to 44½ lbs., that is, the pressure as indicated by a pressure gauge at the level of the nozzle; the length of hose was 40 feet; the main which supplied the water in Farringdon-street was 14 inches in diameter; the branch which supplied the hydrants leading out from that main, was a 6-inch branch; the water way of the hydrants was 3½ inches, and the mean of the trials gave this result. With single jets of water, half-inch nozzles gave a height of 56 feet; ¾-inch nozzles gave 69 feet, and 1-inch nozzles gave 73 feet; each of the hydrants had double outlets, so that two sets of hose could be attached to them, and they were then tried with both jets playing at the same time, and practically the results were the same as with single jets. It was not possible to observe the exact height which the water struck with great accuracy, because the wind was slightly gusty.

780 There was no perceptible difference in the force of delivery?—None with double jets

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781. Did you take the level of the ground on which the experiments were made above ordnance datum?—It was 25 feet above ordnance datum.

782. With a pressure, as you have stated, of a little above 40 lbs.?—Varying from 42 lbs. to 44½ lbs.

783. You say you tried two hose attached to a hydrant; did you try more than one hydrant on a main at the same time?—No; each of the hydrants has two outlets, and we only tried two at the same time.

784. You did not attempt to draw upon the supply to a greater extent than with two hose?—No.

785. Have you tested the pressure at other points of the New River supply?—Yes; by the direction of the Gas and Water Committee of the Corporation, I had the New River Company's pressure taken at seven different places in the City, those comprising the highest as well as the lowest spots in the City; in fact, four out of the number were at points which are amongst the highest spots in the City; one was nearly the highest spot in the City.

786. What is that point?—The very highest point in the City is, to the best of my recollection, at the extreme top of Aldersgate-street, but there is not a material difference between that and the City boundary in Holborn, which is the next highest spot, just at the end of Gray's Inn-lane.

787. But these seven experiments were made over the whole area of the City?—Yes, over the whole area of the City, from east to west, and very far north.

788. Those experiments were made, I suppose, upon mains that are constantly charged?—Yes; they were taken every quarter of an hour for 24 hours in each case, so that the whole of the variations in pressure were ascertained; in fact, I have them before me in this diagram (*producing a diagram*).

789. Can you tell the Committee what the results were of those experiments?—The lowest pressure observed was 22½ lbs., and the highest 48½ lbs.

790. Where was the lowest?—The lowest pressure was in Holborn, not far from Fetter-lane.

791. That is near the highest point, in fact?—Yes, near the highest surface-level; the highest pressure was in Thames-street, near to London Bridge, where it was 48½ lbs. Now, taking the mean of the highest and the lowest, taking the mean of the whole of the observations, in fact, the lowest pressure was 25¾ lbs., and the highest 44¼ lbs. Taking the mean pressure at each of those points where the pressures were observed, the probable height of the jets would be as follows, dismissing decimal points. I call it the "probable height" of the jet, because the wind and other causes would vary it materially. At Farringdon-street the jet would be about 83 feet high.

792. That was with what pressure?—That was with a pressure of 42½ lbs. I am now giving the Committee the heights which are the results of the theory of hydraulics in respect of jets of water.

793. Is that the height of the rise of the column or the height of the actual jet delivered?—This is the height to which the water ought to rise, supposing there had been a perfectly calm day without any disturbing causes.

794. Mr. *Ritchie.*] A pound of pressure gives about two feet of rise, does it not?—It is about 2·3 feet; but, for all practical considerations, one pound of pressure is equal to about two feet of rise.

795. *Chairman.*] Sir Joseph Bazalgette told the Committee that 2·3 was the rise of the column of water; it would not represent a jet?—It will not represent a jet, because the action of the atmosphere and one or two other things interfere with the jet of water as it rises into the air. The weight of the column, if you throw it up vertically, prevents the lower portion of the water from rising; the most effective jet is obtained when thrown at such an angle as that it shall not be oppressed, so to speak, by the weight of that which is above it. In Farringdon-street the height of the jet ought to be 83 feet.

796. Sir *James M'Garel-Hogg.*] Is that taking the extreme pressure or the mean?—That is the height to which the jet ought to rise with the pressure I have given you, namely, 42½ lbs.; practically, you do not get quite that jet.

797. *Chairman.*] Are those pressures the same with those jets, or do they vary?—No; some vary.

798. Will you give the pressure which there was at the time?—I will give the mean pressure. At Farringdon-street there was a pressure of 42½ lbs., and a jet

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a jet of 83 feet; in Bishopsgate-street Without, near the church, with 29 lbs. pressure, a jet of 60 feet; at Cheapside, at the western end, with 28½ lbs. pressure, a 59-feet jet; at Holborn, by Fetter-lane, with 25¾ lbs. pressure, a jet of 53 feet; in Lower Thames-street, by London-bridge, with 44¼ lbs. pressure, an 85-feet jet; in Queen Victoria-street, western end, with 42½ lbs. pressure, an 83-feet jet; in St. Paul's Churchyard, western end, near Ludgate-hill, with a pressure of 30¾ lbs. a 63-feet jet. I think, if you were to take generally something like 10 per cent. off these heights given for the jets, you would get about the heights to which water would be thrown, assuming you had the nozzles of the proper diameter to get the most effective jet out of the pressure.

799. Mr. *Onslow.*] Under the most favourable conditions of atmosphere, would those heights ever practically be reached for the purpose of putting out a fire?—I should think, without being very positive about it, that 10 per cent. less than the heights I have given to the Committee would be the jets which you would get, under favourable conditions of atmosphere, with the nozzle which was the most effective for the purpose. The size of nozzle which can be used effectively varies considerably; when you get a high pressure you cannot use a very small nozzle.

800. *Chairman.*] I understand you to say that those experiments were made with a nozzle of one inch diameter?—The experiments which the Corporation made were, but what I have just referred to are the theoretic heights; they are not from experiments of mine.

801. But I understand you to represent that a one-inch diameter nozzle produced the best results in the experiments which the Corporation undertook; and then you give the Committee what you believe to be the theoretical heights which could be got out of those other experiments, I suppose with the same nozzle?—No; with the size of nozzle which is best adapted to the particular pressure, because to get an effective jet you must vary the size of the nozzle according to the pressure of the water.

802. Does your calculation suppose the ordinary length of hose, or any given length of hose as applied to the hydrants?—It implies a short length of hose.

803. What would you call a short length of hose; the ordinary length of a hose is 40 feet?—One length of hose is 40 feet.

804. And one length of hose would theoretically you believe give the heights you have stated?—Yes, or thereabouts.

805. You have informed the Committee what the height of the jet would be if one hydrant were used with a 40-feet length of hose. But supposing you were drawing upon the same main by three or four hydrants, would you still represent that the same amount of jet would be obtained?—That would entirely depend upon the size of the main from which the supply was obtained. For instance, I have stated here that when we used the two hoses simultaneously in experiments which the Corporation made we got exactly the same height of jet.

806-7. That was from a 14-inch main?—That drew from a 14-inch main through a 6-inch branch.

808. That was not two hydrants, it was two hose applied to the nozzle of the same hydrant?—Quite so.

809. From those experiments do you yourself believe that hydrants might be effectively applied throughout the whole of the New River Company's area on their constantly charged mains?—I should prefer speaking simply with regard to the City of London. I think you may depend upon those jets which I have stated being obtained throughout the City.

810. That is to say throughout those parts of the City in which the New River Company give their supply with their mains constantly charged?—Yes.

811. The New River Company are preparing, are they not, to give you a greater pressure than you have at this present moment in the City?—Yes, the New River Company has informed the Corporation that they are about to give an additional 50 feet head of water over about two-thirds of the whole City.

812. What do you think would be the height of jet that you ought to secure for the purpose of extinguishing fire in the City?—There are persons more

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competent to give you an opinion upon that point than I am. My own opinion is that we ought to be able, looking to the great height to which houses are carried now-a-days, to secure from 80 to 100 feet effective jets of water.

813. And, supposing the circumstances to be favourable and the appliances the proper ones, what amount of pressure would that represent?—About 60 lbs. pressure, speaking in round numbers, would give you 100 feet jet of water.

814. Then, in fact, in order to be tolerably certain of a proper delivery of water, the pressure ought to be not less than 60 lbs.?—About that.

815. Then, when the New River Company have given this additional pressure, what would be the pressure in their mains, because their existing pressure does not come up to that in any part of the City area?—I can tell you what the probable height of jets would be at all those points which I have already mentioned to the Committee; they would vary from about 90 feet to 116 feet, with the additional 50 feet head that I have spoken of.

816. I suppose the object of these experiments was to test whether the City would be justified in laying down hydrants over the streets supplied by the New River Company?—It was rather with the view of testing the five-pattern hydrants which were sent in, because they knew beforehand that with the pressure which was obtainable in most parts of the City they would get very considerable jets of water.

817. Then you would represent to the Committee that the Corporation had satisfied themselves that the placing hydrants upon the present supply given by the New River Company would produce satisfactory results?—Throughout a large portion of the City, because they were informed, some time ago, that the New River Company was about to increase its pressure throughout a considerable part of the City.

818. That entered into their calculation in undertaking this new system?—I have no doubt that it did.

819. But still I suppose they consulted you upon the point?—The point has not, to the best of my recollection, been specially referred to me, but the subject has been discussed, and it is quite understood that they would be able to get, at all events, if not quite the jets which I have named to you, yet a very valuable supply of water from hydrants for extinguishing fire.

820. And the Corporation, from the experiments which have been made under your superintendence, are going on with this work of placing hydrants over the City, in order to give them greater facilities for coping with fire?—They have gone on to the extent I have named, and I cannot say anything more than that.

821. Can you state to the Committee what the cost has been up to the present time, first of the branches, and then of the hydrants?—The average cost of the branches has been 16 *l.* each.

822. Did that include the breaking up and relaying of the streets, as well as the pipes and fixing everything ready for the hydrants?—Yes, ready for the hydrant to be attached to the branch.

823. I suppose that represents a very considerable length of branch in some cases, does it not?—Yes; the New River Company has not mains throughout the whole of the City; the term "main" meaning technically a pipe which is always charged; in a number of cases those branches have had to be carried very considerable lengths indeed to connect with the mains; I can give the Committee three or four illustrations of that; in one case there are 133 yards of branch, and there are a number of them 40 and 50 yards in length (*handing in a plan to the Committee, showing the distances which the branches were carried*).

824. The 16 *l.* does not represent really the cost of establishing a system of hydrants if you had a proper system of constant supply mains?—If you had a system of constant supply mains, that is to say mains constantly charged in every street, you would have then comparatively only very short lengths of branches to lay down.

825. And that, to a certain extent, would reconcile the difference of cost which is shown to the Committee, as existing between the system carried out in some provincial towns, and that which they propose to carry out in the City?—I do not know what has been said about provincial towns, or only very generally.

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826. It has been represented to the Committee that the cost of laying down a system of hydrants in Manchester and other places, was absurdly small as compared with what the City were prepared to incur?—I am quite prepared to hear that the cost would be very much smaller than what is proposed to be incurred for laying down hydrants in the City, and I will also say that a branch laid in the City would be very much dearer than in many, and in fact most other parts of London. 16 *l.* certainly would not represent the cost of similar work in the metropolis. I should say that one-half that amount would be nearer the correct one.

827. Could you give the Committee your reasons for putting down so large an amount for the work required to be done in the City?—In the first place the whole of the streets of the City are filled with pipes of various descriptions. Generally speaking there are two or three gas and water pipes in each street; there are lines of telegraph wires in pipes in almost every main street; the houses have not very large frontages, and there are services of gas and water which come at right angles to the general lines of pipe in the streets, and the consequence is that you open the ground without knowing what obstacles you will find in the way of laying your branches; they have to be twisted and curved and carried over and under other pipes as circumstances may demand. Directly you approach the footways you come upon vaults, and there are the appliances of the sewers, which frequently are very much in the way. In fact it is exceedingly difficult, indeed almost an impossibility, to select any spot in the City where you shall not find one or other of those obstacles to laying down a branch for a hydrant. Then again, the exigencies of the City commerce require that the work should be done to suit the commerce rather than in the cheapest possible way. We rarely open in any street in London more than one hole at a time; and there is just as much supervision required over one trench as if half a dozen were going on in the same street. We very frequently have to make temporary footways for the passengers, and special provision for the traffic, for many of our streets are not wide enough for more than two or three carts at a time. Short lengths of trench only are opened at times and all that involves a very large waste of time; and time, in the present day, when the men are not given to celerity in their movements if they can possibly help it, is a very serious business. Then there is another thing. Much of this work in the City has, for the convenience of the traffic, to be done at night, and the men frequently have to wait until it suits the convenience of the water companies to turn off the supplies and free the mains from pressure. In addition to that, as many of those hydrants were laid in streets which were about to be repaved with wood or asphalte, it was essential that the trenches should be so filled in that the new pavement should not sink and get out of condition; and the trenches were in all such cases filled in with concrete throughout their entire length. Then in some instances the line of branch had to be laid through or beneath existing wood or asphalte pavement, and the reparation of wood and asphalte is in many cases an exceedingly expensive thing. For instance, the cost of relaying asphalte varies from 5 *s.* 9 *d.* to 16 *s.* 6 *d.* per yard, whereas ordinary granite can be taken up and relaid at something like a 1 *s.* a yard; if the foundation is of concrete it costs more; if the foundation is the same as that of the ordinary run of pavements in the City, another 6 *d.* covers everything, and you have that 1 *s.* 6 *d.* against 13 *s.* or 14 *s.* a yard to be paid for the relaying of asphalte. If you put all these things together you will see why the branches in the City have cost so very large a sum of money.

828. Therefore you would represent to the Committee as you have stated, that the cost of laying those branches in the City ought not to be taken as the cost implied in carrying out a similar system in other portions of the metropolis?—Quite so, and there is another thing which I should like to mention to the Committee. In all cases in the City we have had to cut out a length of the New River Company's main and substitute a short length, having a proper orifice for the connection of the hydrant.

829. That would be the case in all systems, would it not?—Yes, but a great many of the mains in the City are very large; we have had a good many, 10, 12, 14, and 16-inch mains to deal with.

830. And that increases the cost of applying those branches to them?—Yes, very much.

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831. Can you give the Committee any idea of the cost that would be implied by the adoption of the hydrants which the Corporation are supposed to favour?—In the first place with regard to the estimates for the 60 designs which were sent in, their prices varied from 1 *l.* 14 *s.* to 24 *l.* for the hydrant itself delivered.

832. I asked you that question with a view of ascertaining whether you agreed with a witness who has already stated that the total cost, including branch, hydrant, and everything, would be from 25 *l.* to 30 *l.*?—I do not think it will be as much as that. The New River Company has undertaken to supply the City in future, with the lengths of pipe needed at the cost price to themselves, and that will help to reduce the cost.

833. And that the 16 *l.* will not in future represent the amount?—I do not think it will, and I have suggested that we should ask the water company whether, looking at the great length of branch which the Corporation has had to lay, the water company should not meet us in some way, because it is quite clear that if they had mains in the streets throughout the whole of the City, we should not have this extreme length of branch to lay down. It seems to me inevitable that a constant supply should be given to the metropolis some day or other, and I think we may hope the New River Company will meet us upon this point, and that will reduce the cost of future branches.

834. I suppose you would from your knowledge of them, say that hydrants are a very valuable assistance for the purpose of extinguishing fire?—I should think, assuming you have sufficiently large mains, they ought to be a very valuable assistance in extinguishing fires.

835. Do you think that the arrangements which the City propose to carry out would be a great aid to Captain Shaw and his work with the brigade?—Yes, I think so, with the assistance of the police. If you had hydrants throughout the whole of the City, I think that the police should have the means at hand of beginning to use these hydrants as quickly as possible.

836. I suppose you would say that material such as hose and other appliances should be kept by the hydrants, and that the police on duty should be acquainted with the use of them?—Yes, all that is needed is to screw on the hose as quickly as possible when there is an alarm of fire; by that time, or probably before, but certainly then, the fire brigade would have arrived. It is always considered, I think, that the first five minutes from the outbreak of a fire are the most important.

837. In that way you clearly would get great assistance from the hydrants?—I believe they will be of immense value in the City.

838. And if hydrants would be of immense value in the City, they would be of value wherever you have those conditions of constant supply at the same pressure as you have in the New River Company's mains?—Yes, but I by no means think it would be necessary to lay down hydrants throughout the metropolis indiscriminately. If you consider that after all the great bulk of streets in the metropolis are streets filled with inhabited houses, and many of them small houses, and a large number of them detached, or semi-detached houses, I do not think it at all essential to put fire hydrants throughout districts like that, but in all the main streets of the metropolis, and those parts where the population is most dense, I believe hydrants would be of enormous service.

839. Sir Joseph Bazalgette gave evidence before this Committee; and in answer to Question 5643, he stated, "I say that as long as engines are used, hydrants are of no use whatever to the Metropolitan Board of Works in extinguishing fires with the present pressure;" and we have it in evidence that it was very doubtful whether it would be of advantage to put down hydrants in some parts of the town on account of the uncertainty that the fire brigade would be in, as to whether they were dependent on turncocks for the supply of water, or whether they could use them themselves?—My opinion is different on that point; I think that hydrants would be very valuable adjuncts to the fire brigade. I think that in all the closer parts of the town if the police have the means, and know how to attach the hose to those hydrants, they would three times out of four get the hydrants attached, if not the water playing, before the fire brigade could arrive at the spot.

840. You would see no disadvantage in applying hydrants over parts of the town, and not universally?—None.

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841. In fact there would be an advantage, because, as you describe, the hydrants might be applied in places where, from the crowding of the buildings and the collection of property, they would be more wanted?—Of course the danger of fire increases with the density of population and the closeness of the houses together, besides I believe that fires are comparatively rare in simple residential property.

842. Do you know the metropolis well, as far as its water supply is concerned?—Generally; nothing more.

843. There are many parts of the town, are there not, where it would be impossible to use hydrants from the fact that the size of the pipes is absolutely inadequate?—I cannot answer that question. I should think it must be so, because the water companies have simply laid out their systems with a view to giving a supply of water for domestic purposes.

844. At the commencement of your evidence you stated, I think, that you thought more than 40 feet of hose, that nearly 100 feet of hose could be worked efficiently with the hydrants with which you experimented. The Committee have had it in evidence that with the pressure at present existing in London, 200 feet of hose would entirely exhaust the pressure without throwing any jet at all; is that your opinion?—Certainly not; with a pressure of 25 pounds and upwards, 200 or 300 feet of hose would not exhaust the pressure; that is perfectly certain.

845. Let me read you Questions and Answers 5781 and 5782 from Sir Joseph Bazalgette's evidence: "I think I understood you to say that, generally speaking, throughout London, with a hose of 200 feet long, the water would not rise beyond the surface? *(A.)* That is so; the pressure would be exhausted in delivering that quantity of water through the hose. *(Q.)* So that, generally speaking, taking London throughout, water passing through a hose of 200 feet in length would not go beyond the surface? *(A.)* You may get a small jet and throw it up, but generally speaking you will not get it beyond the surface without pressure"?—I think that cannot be the case. With a very small pressure it might be so, but taking the pressure we have in Farringdon-street, I have not the remotest doubt you would get a very fine jet of water with 300 feet of hose. I can give you the results of some experiments which I had made. With 27½-lbs. pressure, with a three-quarter inch nozzle and 40 feet of hose, I obtained a jet of 50 feet. With 300 feet of hose that jet had fallen to 41 feet; that was all the difference in the height of the jet.

846. Was that with the same pressure?—Yes, with the same pressure, as nearly as possible.

847. The average pressures as given to the Committee of the different companies vary from 20 lbs. (with the exception of Lambeth) to 48 lbs; the New River Company from 25 lbs. to 40 lbs.; the Southwark and Vauxhall Company from 20 lbs. to 40 lbs. on the average; the West Middlesex Company from 20 lbs. to 30 lbs; the Grand Junction Water Company from 30 lbs. to 40 lbs.; and the pressure of the Lambeth Waterworks Company varying from 10 lbs. to 70 lbs. in different parts; therefore, in none of those pressures would the result that we have described, of an absolute want of jet with 200 feet of hose, occur according to your idea?—I believe what I am telling the Committee is perfectly reliable and true, although I did not myself witness these experiments; they were made by my direction; those in Farringdon-street I did, but I believe the results which I am telling you now are correct. I cannot imagine that 300 feet of hose would so reduce the pressure as to prevent a jet of any value being obtained under the conditions you have named.

848. If that is your opinion, I suppose it would be your opinion also that it would not be a waste of money on the part of the Metropolitan Board of Works to place hydrants on existing supplies of water, where mains were constantly charged, with the varying pressures of the different companies as they have been stated to the Committee?—Captain Shaw and others can give you a better opinion than I can about the height of a jet which is of value for extinguishing fires; but I should imagine that if you have even a jet of 30, or 35, or 40 feet, it would be valuable throughout a large portion of the metropolis. As I said before, the jet ought to be everywhere 100 feet, but still even a jet of 30 feet or 40 feet must be valuable.

849. I would refer you to a question which was answered by Mr. Bramwell,

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No. 5823, in which Mr. Bramwell is describing some experiments which were made by Sir Joseph Bazalgette, Mr. Easton, and himself, at Grays, and he says, "The result of these experiments is that, when delivering 150 gallons a minute through a 2½-inch hose, every foot length of that hose reduces the pressure by a quarter of its own length, or three inches head of water, so that 200 feet of hose reduces the pressure by 50 feet head of water; that is to say, 200 feet of hose takes off, when delivering 150 gallons a minute, 10 feet more pressure than the East London Water Company by Parliament is compelled to maintain at all. Of course if you deliver a smaller quantity, the reduction becomes very much less"?—I cannot, at a moment's notice, look into questions of this sort. I have told you the actual facts of the experiments I have had made. I can give you those experiments with a half-inch, a three-quarter-inch, and a one-inch nozzle. I should not have imagined myself, I confess, that the friction of that length of hose had been so potent. Of course every one knows that the smaller the diameter and the greater the length, the greater the friction becomes, but I confess I should not have anticipated such a result as that stated. I cannot take upon myself to deny it. I simply tell you the results of the observations taken by myself.

850. Will you state to the Committee what conclusion those observations have led you to?—I can only state the fact that, with a three-quarter inch nozzle, the difference in the height of the jet given by a 40-feet length of hose, and a 300-feet length of hose, was the difference between 50 feet and 41 feet; that is to say, that there was a loss of nine feet by the use of the greater length.

851. Mr. *Ritchie.*] What was the pressure then?—Twenty-seven and a-half pounds.

852. *Chairman.*] According to the statement I have read out of the evidence, that length of hose ought practically to have pretty nearly exhausted the amount of pressure, ought it not?—That is so. The Committee must not understand that, if you prolong the pipe or the hose very greatly, you would get no water out of it, because if you were to put a pipe 20 miles long connected with a head of water, I have no doubt you would get some water out of it at the end, though you might not get a jet.

853. Then, in answer to Question 5365, Sir Joseph Bazalgette said that, in many parts of the town, from the size of the pipes being so small, even the engines would be practically useless; an engine would not be useless if you could get a run of water through the pipe at all?—If the engine were useless, it would be, I suppose, because it would get no water; but then how is it that the people get water into their houses; the water must come out somewhere or the other.

854. And therefore though you would not get a jet from the end of the pipe, however great the length, yet you would represent that there must be a flow?—Yes; I never saw a pipe opened in my life that there was not a flow out of it of some sort. I have not looked at the questions which you have brought under my consideration, and it is very difficult to answer them at a moment's notice and give opinions upon the evidence of other witnesses. I would rather confine myself to what I know of my own knowledge. If there were 500 feet of hose, my belief is, that you would get water through it to some extent.

855. The hose you used was the ordinary fire hose, was it not?—Yes, I forget what the gauge is, but there is but one gauge of fire hose used throughout the whole of the metropolis; it is 2¼ or 2½ inches.

856. Then the result is that you would advise the City authorities that they are acting judiciously in attempting to introduce the system, even with the existing water supply?—With the water supply in the City, with the pressure which they now get, I have no doubt that hydrants will be of very great assistance in extinguishing fires.

857. And you do not see any risk of loss in placing hydrants throughout the City?—There cannot be any loss except the loss of the money, and they will be quite worth their money. Would the Committee allow me to add that my own impression is, that about 20 *l.* a-piece, taking one with another, ought to pay for fixing hydrants throughout the City, but we are, to some extent, dependent in that matter upon the water company; the Corporation desires to do everything that will suit the views of the water company if possible, and they have requested us,

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in many cases, to put down what is called an auxiliary valve; it is in fact another valve put in to act in case the other goes wrong.

858. Have they not contemplated in the City using those hydrants for other purposes than those of fire, namely, for washing the streets?—Yes; the Commissioners of Sewers, who are another branch of the Corporation, have the charge of the roads, and they have arranged with the Gas and Water Committee of the Corporation to bear part of the expenses of the hydrants throughout the whole of the main streets in the City, with a view to washing the pavements daily at a future day.

859. Does that entail an additional cost in the hydrants they adopt?—No.

860. And you use the same hydrant for both purposes?—Yes.

861. Mr. *Forsyth.*] You told the Committee that not fewer than 60 designs of hydrants were sent in by different makers?—Yes.

862. And that they varied in cost from 34 *s.* to 24 *l.*?—Yes.

863. That is an enormous difference: can you give the Committee any idea of the reason for so great a difference in cost between the lowest and the highest?—I really cannot, I am afraid, with any satisfaction to the Committee. One, to the best of my recollection, was a mere cock, and the other was of excessively elaborate construction. I have here a diagram of the five pattern hydrants.

864. Could you tell the Committee what was the cost of the hydrant which, as far as you know, the sub-committee of the gas and water committee of the Corporation thought most favourably of?—The one which appears to be favoured by the Corporation has a sluice valve, and the cost of it is to be 6 *l.* 16 *s.* 3 *d.*; this is a drawing of it (*producing the same*).

865. Is this the same valve as they use in the Inner Temple?—I think not. I think they have what are called disc valves in the Inner Temple. This valve is an expensive form of valve; it is the one which is used almost exclusively by the whole of the waterworks' engineers throughout London, as being the best and most durable. I may say that the best and the most durable is what the Corporation desire to have. We hope not to have to disturb the streets again for the purpose for many years to come.

866. On a previous occasion a witness, Mr. Chadwick, told the Committee that he was of opinion that an engineer could contract for the laying down of hydrants in the metropolis at 3 *l.* per hydrant, exclusive of the branch?—I daresay you can get hydrants at 3 *l.* each; you can get any cheap thing.

867. But I want to know whether you can get an efficient hydrant for that money?—I do not think you can: that is to say, I do not think it can be a lasting and enduring hydrant; something which will not require repairing every two or three years. I do not believe that hydrants which will sustain a heavy pressure, and be serviceable for eight or ten years without requiring any repair, can be supplied and fixed for that price.

868. It would be very bad economy to lay hydrants down at 3 *l.* each, unless they were likely to be thoroughly efficient?—I think so; certainly in the streets of the City of London.

869. I asked a witness this question: "Supposing the practice of laying wooden pavement which has been begun in parts of London were very generally adopted, would not that increase the cost of fixing hydrants," and he said he thought not. I think you told the Committee just now something different from that?—If you had to break up wood or asphalte pavement it would very largely indeed increase the cost of laying branches.

870. I did not quite understand what you meant by saying "the theoretical height of a jet"; will you explain that a little further?—There are certain known formulas by which the height of a jet from a given head of water is arrived at; that is what I call the theoretical height of a jet.

871. When you spoke of "theoretical," you meant as distinct from that ascertained by actual experiment?—That which you would practically get in using the jets. Two men standing together side by side with nozzles and hose under apparently the same conditions will frequently vary 5 feet; nay, as much as 10 feet, in the striking height of the jet, supposing they are directing it against a wall; moving the nozzle an inch backwards or forwards will effect the height; the wind will affect it. Take 10, or indeed it may be 15 per cent. off the jet, which theoretically you should obtain, and you would, I think, get the average

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practical results. I may remark, with regard to all the observations as to height that I have given, that they must not be considered as experiments conducted with scientific care, but as rough practical experiments, and nothing more; but the heights I have given, where I have taken pressures on the New River mains, are the theoretical heights drawn from formulæ which are accepted by all professional men.

872. I suppose diminution in pressure, in proportion to the length of the hose, is caused entirely by the friction, and, of course, the smaller the diameter of the hose the greater the friction?—Yes, speaking generally.

873. Mr. *Hayter.*] If hydrants are laid down in the City, they would be worked by the police, would they not?—There is no intention, that I have heard of, of taking generally the fire service from those who already hold it, but I have no doubt the police in the City would be required to help as far as they could.

874. Would they be drilled for the purpose?—I cannot answer that question. I think they would require very little drill to do all that a policeman ought to do. What they would be required to do would be simply to run a truck, which would practically be a great drum or reel, around which the hose was wound, to the nearest hydrant to the fire, and simply screw it on. All the knowledge required would be gained in a couple of hours by intelligent men. Of course every policeman should have a turn at the work, simple as it is, because the simplest operations of life are the better for a little practice, but there has been no consideration at present given to the extent of the police agency in the matter.

875. Do you wish the Committee to understand from your evidence that you are in favour of a system of hydrants throughout the metropolis, or do you desire to limit your evidence to the City?—I am in favour of a system of hydrants throughout all the thickly populated parts of London. I think when you get into the outskirts the necessities are not such as to demand them.

876. But even where the houses are not high, you still think that there the hydrant system would be useful?—It would be useful, but even the best hydrants will be an annual source of expense, as they will have to be maintained; valves wear out and get out of order; every hydrant ought to be opened and shut, that is to say, examined every two months, and I should say it would be better if it were done every month, as otherwise they might stick.

877. The value of those hydrants almost entirely depends upon the character of the water supply, does it not?—Unless you have a pressure, of course the value of the hydrant diminishes.

878. Do you think the water supply better in the City than in the rest of London that you are acquainted with?—I cannot answer that question. I should think that in a large portion of the denser part of the metropolis to the west of the City the supply is about the same as it is in the City, but I cannot say positively. I see no reason why it should not be as good, the sources of pressure being the same. I have here a diagram which will show the Committee that under the City arrangements for placing hydrants, the requirements of Captain Shaw, which he has informed me of, will be very nearly met (*producing a diagram*).

879. *Chairman.*] You mean his requirements as regards the delivery?—I mean his requirements as regards the number of outlets for water and length of hose. This diagram shows Fleet-street. We can get in Fleet-street at this particular spot (and it is a fair average of the main streets in the City) 14 nozzles, that is to say, 7 hydrants with two outlets to each, with an aggregate length of 2,860 feet of hose. Captain Shaw's proposition was that there should be everywhere 14 outlets capable of being brought to bear with 2,640 feet of hose. Then he says you will want 2,000 gallons a minute through these 14 nozzles; of course the amount of water you will get through will depend upon the pressure and the size of the main, but as regards the placing of hydrants and their situation, we have given Captain Shaw as nearly as possible what he requires; this is a fair illustration of what will be the condition of the City as regards hydrants when the system is carried out.

880. These red lines represent the different hose you would lay out?—Yes.

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881. In one case you have 268 feet, and in two cases 270 feet of hose, and you represent to the Committee that those hydrants would be practically useful with the existing pressure given in the City for the purpose of extinguishing a fire?—I believe in the City they would be useful in nearly all cases, but perhaps they might not be so useful if they were upon very small pipes; they would then only be relatively useful.

882. But the object of my question is this: you have here a test of what we were asking you before; you would have 260 feet of hose, and therefore water delivered throughout that length of hose, and you believe still it would be delivered efficiently for the purpose of fire extinction?—I do, in the City.

883. That is on the present pressure given by the New River Company?—Yes.

884. Sir *Andrew Lusk.*] You have mentioned that the cost of the branches and pipes to a hydrant in the City is 16 *l.*?—Yes.

885. There is a little confusion between the branches and the hydrant; what is the cost of a really good hydrant by itself?—Everyone of these makers would tell you that his hydrant was the best. I think you may get a very good useful hydrant for 4 *l.*, but you will get a very much better one for 6 *l.* 10 *s.*

886. That would be 22 *l.* 10 *s.* that the hydrant would cost; you mentioned that the houses now were getting much higher than they used to be, and of course they require more pressure to be brought to bear upon the water which is to be sent up to a fire?—You want a higher jet to be effective.

887. You said, I think, that hydrants would be useful adjuncts to the fire brigade?—Yes.

888. Will they only be adjuncts; is that all they are to be; you could not depend upon them?—I do not think that hydrants will obviate the necessity for the fire brigade.

889. Then, looking to the extent of the metropolis, you think that you would require to deal carefully in extending the system of hydrants throughout the metropolis?—Yes, I think I would not extend them beyond the denser parts of the metropolis.

890. You mentioned that it would be as well that the police should know something of this matter; do you think that the police should be able to work these hydrants as well as the fire brigade?—I think the police should know how to put on the hose. I do not think that the amount of trouble which the police would have in learning to do so would at all unfit them for their other duties. I should not advise the police to understand the whole art of extinguishing fires, breaking into houses, removing goods, and so forth.

891. But the police would be partly educated and able to manage this matter?—I think the police should be instructed to run the hose to the spot, unroll it, and screw it on to the hydrant.

892. It has been suggested that it would be better that the fire brigade and the police should be amalgamated together; you think that the police should have some little instruction for the purpose, at all events?—If the fire brigade and the police were amalgamated you would still have to set aside a certain number of the police specially for the duty of firemen, and, therefore, it would come to the same thing. I am not suggesting that the fire brigade should be superseded. I think to make men effective as thoroughly good firemen, they require constant training and practice, but you would require very little training and practice to run a truck along a street and screw on a hose to a hydrant; any one could do it after half-an-hour's practice.

893. You mentioned one thing which struck me, that a constant supply of water must be expected some day in London?—Yes.

894. That is a very large question. Where do you think we shall be able to get a constant supply of water for London from?—A constant supply is simply an alteration in the mode of supply; you will require no more water for it. You will require simply a re-arrangement of the distributory system of the waterworks. In fact there is less water consumed under the constant supply system than there is under the intermittent system.

895. The hydrants to be useful would require the mains to be all constantly charged in every street?—They should be.

896. That would require new mains to be put in every street again, would it not?

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not?—The Corporation is getting over that difficulty by itself in running long branches, so that hydrants which they erect will always be charged with water.

897. The City of London is supplied by the New River Company, and that company has facilities which none of the other companies have for giving pressure, because the water is brought up to Islington at a high level?—Most of the other companies have the same facilities, and every other company can get it if it likes. All that it has to do is to pump water up to a reservoir at a high level, and I believe nearly all have the power to do that. As a matter of fact the largest number of them do give a considerable pressure. The New River Company also pump a good deal.

898. But they have advantages which the other companies have not?—The New River Company does deliver a great quantity of water by gravitation, undoubtedly.

899. You mentioned another matter with regard to the hydrants which surprised me; I did not know that they would require to be looked at every month or two months to keep them in order?—Yes, every valve ought to be looked at and lifted to see that the threads of the screws and the valves are in proper working order.

900. You know the metropolitan area is something like 15 miles in radius from Charing Cross, embracing about 120 square miles, and that the City is only one square mile in area. You would not consider it desirable to apply the same system to the whole of the metropolis as you do to the City?—What is good for the City is good for any other part of the metropolis under similar conditions. Of course the probable injury by fire depends upon the closeness of the houses, and the value of the property which is in the houses. A fire in the City is likely to be a much more costly affair than it would be if my house were burnt down; therefore supposing hydrants to assist in extinguishing a fire speedily, and in preventing the destruction of goods, it is much more likely they will be able to save a large amount of property in the City and those parts of the metropolis where there are valuable things to be destroyed than in the outskirts.

901. Sir *James M'Garel-Hogg.*] The New River Company has greater pressure than most of the other companies, has it not?—I think it has.

902. Can you tell the Committee what the mean pressure is now in the City of London; the invariable pressure which you may depend upon?—I have given the Committee the highest and the lowest, the mean between the two gives 35 lbs.; that is, the mean of my observation and nothing more.

903. You think that for hydrants you ought to get a jet of from 80 to 100 feet?—It is desirable for the purpose of extinguishing fire.

904. But the present pressure of the New River Company does not give that?—It does not; but you can get jets in the City varying from 53 to 83 feet, or thereabouts, which are very fine jets, because they will touch the roofs of most of the houses.

905. But this is not the case in the rest of the metropolis?—I am not acquainted with the metropolis generally, but I can conceive that there is no reason why the water companies should not give that pressure if they think proper.

906. You stated that the expense of laying down hydrants in the City was much greater than it would be in other parts of London, owing to the streets being filled with pipes; is not that the case equally with the Strand, Oxford-street, and Piccadilly, and would there not be the same expense there?—No, not as much as in the City; but the Strand, Oxford-street, and many other main thoroughfares closely approach the City in that respect.

907. And is it not the case that outside the City they are laying down wood and asphalte the same as within the City?—They are laying down wood outside the City, but they are not laying down asphalte to any large extent; asphalte is more expensive to take up and lay down than wood.

908. But the expense would be the same under the same circumstances?—Yes, much the same.

909. With regard to the police assisting the fire brigade, you have no idea of the police superseding the fire brigade, but only assisting them?—That is my belief. I think the police would be better kept to their normal functions of looking after life, property, and morals.

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910. With regard to hydrants, you do not think that they would be so useful in the less crowded parts as in the City?—No; hydrants are more useful in the denser parts, where there is valuable property.

911. But unless the supply of water were sufficient, they would be of no service?—Unless there is an efficient jet, useful for fire purposes, it is of no use having a hydrant beyond the facility it offers for getting water readily, because there is undoubtedly a facility in getting water from a hydrant that there is not from a common plug. In the City it is proposed to build these hydrants in pits, so that if they require repair the valves can be taken out without disturbing the pavement; that is another reason why the work will be expensive in the City, everything being done to prevent inconvenience to the public when the work is once done, on account of the immense traffic. The expense is nothing relatively to the inconvenience of the enormous number of people in the City daily.

912. Sir *Henry Peek.*] You gave the Committee a number of results in feet from pounds of pressure in Farringdon-street, Bishopsgate-street, Cheapside, Holborn, Thames-street, Queen Victoria-street, and St. Paul's Churchyard; you said they were all done with one gauge of hose, and with a 40-feet length of hose, but that the nozzles were different?—With regard to the seven places where the pressures were taken, the heights of the jets were the theoretical heights, they were not the results of actual experiments; the actual experiments were conducted in Farringdon-street, but the heights to which the jets ought to rise are well known; there are half-a-dozen books of hydraulics containing tables of this sort.

913. But it appeared to me when you said the nozzles varied, that the experiments were to all intents and purposes worthless?—In the experiments I made the nozzles were the same. I had the experiments made with three sorts of nozzles, but the results I gave you were with the most effective nozzle, namely, the inch-nozzle, that being the most effective one with the pressure we had, but the same size nozzle would not be so efficient either with a less pressure or with a higher pressure; there is another advantage in having a considerable pressure for a jet, namely, that the higher the pressure the larger the nozzle you can use, and therefore the greater quantity of water you can get in a given time on to a fire.

914. Do the fire brigade use different nozzles?—Yes, they use a variety of nozzles. I believe that from a three-quarter of an inch to an inch nozzle is found upon the average to be the most effective, but they keep always by them nozzles of different sizes.

915. Have you seen the evidence that was taken before the Committee last year?—I have looked at some parts of the evidence, but I have not read it carefully.

916. You are quite one of the head officials of the City, are you not?—I am called so, I believe.

917. Do you think that it would contribute to the efficiency of the fire brigade if it were incorporated with the metropolitan police, and if the City police were also incorporated with the metropolitan police in one body?—No; I see no increase of efficiency likely to ensue from that.

918. Would it not give more unity?—There would be more unity in a bureaucratic sense, but I do not know that there will be any other value resulting from that unity. My own observations lead me to the belief that the metropolitan police do act most efficiently and harmoniously with the fire brigade, and I know the City police do.

919. Mr. *Onslow.*] A hydrant in itself has nothing to do with the jet of water, has it?—A hydrant is simply a pipe through which a jet of water is delivered; it is merely the means of conveniently obtaining a jet of water, and nothing else.

920. Then how is it that one class of hydrants is so very much more expensive than another?—Firstly, the construction varies very greatly; and secondly, some of them are made a great deal better than others. If you look at this sheet of hydrants you will see how diverse are the forms. (*The Witness explained the diagrams of the various patterns to the Committee.*)

921. Mr. Bramwell, at the end of his answer to Question 5822, says: "Now I am perfectly prepared to say to the Committee that, in my opinion, it would

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be a waste of money to put hydrants upon mains in which no greater pressure than that was to be maintained." That refers to a pressure of 40 feet; this is after experiments had been made?—That is a low pressure, of course.

922. But you seemed to think that that was hardly borne out by your experiments?—I said that even a 30-feet jet was useful in my opinion in extinguishing fires, but I guarded myself by saying that there are other persons who are better judges of what was an efficient jet than I am; the greater the pressure the higher the jet goes, and the more valuable it becomes.

923. Then Mr. Bramwell says: "Then I say the reason why it would not be expedient to expend money in hydrants upon such a pressure as that is as follows: that you do not in practice, even on a calm day, get more than about five-eighths of the height of the head as a jet of solid water." That is to say, that of a jet of water of 80 feet, you would only have 50 feet of solid water, whereas upon your evidence you ought to get 10 per cent. less than the 80 feet, which is 70 feet; between 50 and 70 feet, there is a very great difference indeed?—You will frequently get a jet of water in only moderately windy weather deflected 25 feet in a moment, and sometimes even cast up 10 or 15 feet beyond the altitude due to the force of the water; it is a very difficult thing to observe under ordinary conditions the height a jet of water will go.

924. Is your evidence with regard to the height of the jets from actual experience?—It is from my own experiments which appear to give 10 per cent. or thereabouts less than the theoretic height of the jet.

925. In your opinion would there be much saving of water by the use of hydrants?—Yes, I should think there would, but I do not think the quantity of water consumed in fires in relation to the total supply given by any company during the year is any appreciable quantity, but it would certainly lead to a saving of water.

926. Mr. *Ritchie.*] Do you know how many miles the New River Company have in the City under high pressure?—I do not.

927. Do you know the number of miles they have under their whole supply?—I do not.

928. You stated, I think, that there was certain to be a constant supply some day?—I think so.

929. Do not you think that it would be very advisable to put down hydrants now over that portion of the metropolis, where high pressure could be obtained without waiting?—Over all the more densely inhabited parts of the metropolis.

930. Without waiting until the whole of the metropolis was supplied with constant supply?—I think that the placing of hydrants would help to bring a constant supply.

931. Therefore, if you occupied the position at the Metropolitan Board of Works that you do in the City, you would be prepared to recommend the Metropolitan Board of Works to put down hydrants in those portions of the metropolis which are closely populated, where you could get a constant supply at high pressure, without waiting until it should be done to the whole of the metropolis?—I think I should.

932. Now with reference to the difference in the cost of the hydrants, is not some portion of the difference, as between Manchester and London, accounted for by the fact that you have sluice valves to your hydrants, which they do not have in Manchester?—Yes, the sluice valves are more expensive than the other form of valve, but I really do not know what they have in Manchester. I have heard that the hydrants there are exceedingly cheap.

933. Have you heard that they are effective for the purpose?—I have heard that they are effective at Manchester.

934. There are hydrants with sluice valves, and without sluice valves, are there not?—I do not know. I must tell the Committee that the whole of the metropolitan water companies use nothing but sluice valves, which is pretty good evidence of their superiority. I may mention that I do not know what is the size of the water-way of the hydrants at Manchester; that also very much affects the cost of the hydrant.

935. With regard to the distance apart you have put down hydrants in the City, do you think the distance apart you have put them is not too great to enable you to cope with the fire which might take place?—I do not think

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think so. You will observe it agrees very closely with that which Captain Shaw recommends.

936. I observe that Captain Shaw proposed to put them twice as close as you have done in the City?—Captain Shaw's requirements, as given to me, were 14 mouths, or nozzles, with about half a mile of hose in the aggregate, and I say that, as the hydrants will be arranged in the City, they will almost everywhere comply with those requirements.

937. Sir Joseph Bazalgette, when he was examined before this Committee, in reply to my Question No. 5728, "But if the hydrants were also placed at the same distance as they are going to be placed in the City, the expense would only be a quarter of a million," replied, "Yes, because you would only have half the number." That implies that he contemplated putting them down twice as close to one another as you have done?—I do not know what he contemplated.

938. You say that what you proposed to do in the City is much the same as what is proposed to be done outside?—No, I stated that the arrangements proposed in the City will comply closely with the requirements of Captain Shaw, his requirements being 14 outlets so arranged that when they are all in use at the same time they shall only require half-a-mile of hose, and I give as an illustration a spot in Fleet-street which complies with that closely. Therefore if the water companies supply sufficient water, there will be no difficulty in getting the rest of his requirements; that is to say, 2,000 gallons a minute through those 14 nozzles.

939. But I ask you to look at Question No. 5728; now, does not it appear to you that in contemplating putting down hydrants outside the City, they contemplated putting them down twice as closely as you have proposed in the City?—I so understand it from this answer.

940. But you still think, notwithstanding that, that if the hydrants in the metropolis were put down as close to one another as they are in the City, that would be all that was requisite for the purpose?—I do.

941. And would carry out even the requirements of Captain Shaw as to conveying a number of hydrants upon a given spot?—Quite so, provided the water company gave the required pressure to give the requisite quantity of water through those 14 nozzles.

942. That leads to another question; you contemplate, I understand, to do that using hose on some of the hydrants 300 feet long?—Close upon it. I will give you the exact lengths that are needed.

943. The Committee have it in evidence from Mr. Bramwell that water going through this hose will lose three inches of height in every 12 inches of water that passes through, so that if you have started with a pressure of 75 feet, if Mr. Bramwell's theory be correct, by the time the water came to the end of your 300 feet of hose it would lose 75 feet of pressure, and therefore there would be no pressure at all?—I do not understand that at all.

944. You made some experiments by way I presume of finding out what was the loss of pressure in passing through the hose?—I made them with a view to see what the loss would be.

945. And you found that in passing through a hose of 300 feet that the loss was only 9 feet in 50 feet?—Only 9 feet. I also said that I had not witnessed the experiments myself, but I believed them to be strictly correct; that they were rough experiments. I am obliged to repeat that, because very fine experiments are a very difficult thing to make, and I am not aware that they have ever been made with this length of hose by anybody. If you have rough experiments for practical purposes that would be sufficient.

946. Mr. *M'Lagan.*] There is a considerable quantity of valuable property along the river side, is there not?—Yes.

947. Have you ever turned your attention to the best way of extinguishing fire in property of that description?—No, I have not; I take it that hydrants will be the best means.

948. You are acquainted with the steam floats that we have now for the purpose?—I am.

949. I am not aware whether you have seen the resolution which has been arrived at by the Metropolitan Board of Works, to have flat-bottomed rafts, and

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Lieut. Colonel W. Haywood.

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to put ordinary land engines upon them, and to have a tug to draw them to the scene of a fire?—I have not seen it.

950. How do you think from your practical experience such a device as that would act?—I should think it would be very efficacious to bring them close up to the scene of the fire.

951. Do you think, in certain conditions of the tide, the tug will be able to bring the raft up sufficiently near to the fire to act with efficiency?—I should think that it would, but it would require to be specially designed for the purpose.

952. It would require to be a flat-bottomed tug?—Yes, with a draught of next to nothing.

953. Are you aware that in the last fire which took place in the warehouses there, the reason why the destruction of property was so great was that they could not get the steam-floats nearer?—I did not know that.

954. Then, I presume you have not paid much attention to the question of steam-floats?—I have not.

Mr. *William Swanton*, is called again; and further Examined.

Mr. W. Swanton.

955. *Chairman.*] I believe you have asked the Committee to allow you to explain certain questions which were put to you last year?—It is with regard to certain matters upon which Captain Shaw quite denies the correctness of my evidence.

956. Captain Shaw made some remarks at the end of the meeting of the Committee upon the evidence you had given?—Yes, you will find them at pages 596 and 597 of the Proceedings of the Committee.

957. The first point which you wish to call attention to, I think, was with regard to your statement as to the floats at the Rotherhithe fire, was it not?—Yes.

958. You wish to put before the Committee letters which were written at the time which bear out your statements made in evidence here, with regard to the time at which the floats arrived?—Quite so; not only my statements, but Mr. Lovell's also, in reference to the floats at that fire.

959. Those letters, with your letter to Mr. Lovell, corroborates your statements?—I believe they do, and I hope the Committee will think so.

960. The first letter is from a man of the name of Cooper; who is he?—That is our foreman in charge of the southern district, the D. district on the brigade's map.

961. He confirms your statement upon the question of time?—He confirms a portion of it.

962. He states in his letter that when the turncock started the water he took the time, and it was then five minutes past six, and he is certain that there was no float at work until a quarter of an hour or 20 minutes afterwards?—That is so.

963. Then you put in a letter from Walter Rea?—Yes; he is another of our principal men who was specially told off for the purpose of ascertaining when the water was procured and when the floats did arrive.

964. He states that he went by your direction to the waterside for the purpose of timing the arrival of the several floats; he states that "One of them, the D. or Rotherhithe float, was lying well out, but not at work, neither did she get her first line of hose to the fire till 15 minutes past six; at this time a steam tug came up with the C. barge (Limehouse float, two land steamers) in tow;" he states that he "asked several people the time, and was told a quarter past six; but as they were not positive as to minutes, I looked at the public-house clock outside the gates; the time there was, as I have stated, a quarter past six;" he "asked the policeman in charge of the door if the clock was quite right, and he told me it was; I then ran to you with these particulars, and you, pointing to a clock that was still going, said that the time I had given was quite correct, but added you thought the clock might possibly be a little out through the smoke, &c., and you sent a man into the 'King and Queen' public-house to see if it was so, at the same time telling me to go back and see when the B. float from Southwark-bridge came in; she was just steaming in when I got

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got there at 6.20, and I took the time in the same manner as I did before; the clock on the wall kept going till 6.35, and was afterwards buried by the wall falling;" then there is another letter from James Payne; who is he?—He is the superintendent of the granaries which were burnt down at the time.

965. He states in his letter in answer to a question put to him by Mr. Goodchild: "I beg to say that I passed Rotherhithe Church at 10 minutes to 6 on the morning of the fire; walked to near 'King and Queen'; could not pass; returned to Surrey Dock-stairs"——

966. Mr *Ritchie*.] Captain Shaw did not contradict you upon that point?—Captain Shaw's words are that he is prepared to rebut the whole of my evidence about the floats; you will find it at page 596, Question 8090.

967. *Chairman*.] Payne says: "I could not pass; returned to Surrey Dock-stairs; hired a waterman and rowed down; ordered and got men to remove my own and all craft then afloat, and landed at King and Queen-stairs at 6.15. The float was then being warped up from some distance below 'King and Queen'; say, off Marshall and Rennie's Dock, or perhaps a little this side. By direction of one of your officers I had my offices cleared of all books and papers, desks, &c.; by this time it was 6.30; to the best of my belief she was not working then. In answer to my inquiry, one of the officers told me she was disabled." You wish the Committee to understand from those letters that the statement which you made is substantially borne out?—By those papers which were presented at the time; and they have not been altered since.

968. Those letters are all dated at the time?—Yes, shortly after the fire.

969. And they were all from other witnesses corroborating what you put before the Committee?—Yes, three other witnesses.

970. Then there is another question, I think, with regard to the Pantechnicon fire which you wish to explain?—That is the next question Captain Shaw referred to.

971. Captain Shaw states: "I wish to point out that the witness was asked, 'Were you present when the engine got there?'" to which you replied, "'I was busy inside the building, and I did not see when it got to work; but I know that the brigade engine from Pimlico came up almost as soon as that engine did, and it got its hose out, and as the plug was required for one engine the private engine was moved out of the way to make room for the public engine?' All that is wrong in point of time"; what do you wish to say upon that point?—I wish to show the Committee by this report, which I gave to my committee at the time, that what I stated then was to the best of my belief correct, and the report to my committee confirms that. (*The same was handed in.*)

972. Will you mention the points upon which you would like to give evidence?—I think it would answer the purpose to show that I was at the fire in sufficient time to assist in the removal of 65 carriages from the place, which was subsequently burnt down, and that I could not have been very late in getting there to be in time to assist in all that, as the fire burned very rapidly.

973. You want to point out in proof of that, that you were there, and did a great deal of work in removing property from the fire?—I do; 65 carriages were removed under my direction from the fire, and that shows, I submit, that I could not have been very late, as they were removed with much difficulty.

974. I think your report states that your men removed the carriages, and that the *employés* there were assisting with ropes which were attached to those carriages by you, and that they then took the carriages out?—Quite so; the *employés* helped our men to get them out after we had made the start.

975. Mr. *Clifton*.] Where were you when the call to the fire came?—At home, in Watling-street.

976. How long does it take to get from Watling-street to the Pantechnicon?—It is a nice clear road along the Embankment. I should say we could do it in about a quarter of an hour or 20 minutes.

977. The neighbourhood would not be crowded at that time?—It is not by any means bad to get along; it is under four miles, I think, from our place to the Pantechnicon, and I should think we should go along at the rate of from 10 to 12 miles an hour; it is a matter of three or four minutes only turning out the men and horses at our station.

978. Then you wish to say something about the steam engines at the stations?—Yes; Captain Shaw entirely ignores my experience in saying that "it would

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Mr. W. Swanton. 26 March 1877.

be a very bad mode of arranging engines for the service of London," if steam engines alone were kept at the stations, and no manuals were there. Now I say from my knowledge of the business that a steam-engine, with her water kept well warm at any station, would be quite as available for a fire in the neighbourhood as a manual would. I say so because we have in many cases to wait for a large number of people, say 20 (it frequently requires that number), to pump a manual engine of ordinary power.

979. All you want to do is to re-assert your opinion from your experience?—I only wish the Committee to believe that I really do know more than Captain Shaw gave me credit for knowing about fire brigade work.

980. What is the next point which you wish to explain?—The next point is with reference to the fire-escapes. Captain Shaw states, as showing that I know nothing of the service of the fire-escapes, that there used to be auxiliaries to assist at the escapes. I have since ascertained from the Secretary of the Society for the Protection of Life from Fire, that I was perfectly correct in saying as I did, that no supernumeraries are used at the escapes when on duty.

981. But might not Captain Shaw's remark imply that there was a staff of supernumeraries kept to assist when the men might be on the sick-list?—I am quite willing to accept that if you think so. Then with regard to the eight hours' work; great stress was laid upon my evidence, as making it appear that the brigade people had nothing to do. Now I am still of the same opinion, and can really see nothing to induce me to alter my opinion.

982. Sir *James M'Garel-Hogg.*] What are you referring to?—You will find it at page 596, Question 7145. I am quite sure that taking the whole force, and the work they do, exactly as you would take the same number of mechanics, those men do not positively work more than eight hours in the 24.

983. I suppose you admit that the men have given different evidence with regard to that?—I wish I could endorse all that they have said, but I really cannot. If Captain Shaw had contradicted any of the other witnesses, and had ridiculed their evidence as much as he did mine, I should not have taken any notice of it; but I am taken notice of and singled out of 26 or 27 other witnesses, and I feel it is a great injustice. I am looked to by my committee as much as Captain Shaw is by his, and I have a wish to put myself straight with this Committee, at least.

984. *Chairman.*] You now put the matter in a light in which I did not see it before, because I imagined what you wanted to do was to correct statements which were not borne out by facts, with regard to what had been said about your evidence; now, I think, your next point is with regard to Question 7146, on which some doubts have been thrown?—I said in my evidence that I had gone through all the work of the brigade myself, and therefore I could speak of it. Captain Shaw says he wishes to deny that. Now I say that, with the long written history I have given you of my experience and past services, he cannot deny it. All he said of me was published in the newspapers at the time, and I feel it does me a great injustice, and I am obliged to the Committee for allowing me this opportunity to correct it.

985. Captain Shaw says, with regard to Question 7146, "Mr. Swanton concludes his answer by saying, 'I have gone through it myself, and therefore I can speak of it'; I wish to deny that. He was in the brigade formerly, but he was not in the brigade as it exists now under the Metropolitan Board of Works, and he cannot know the duties of his own knowledge"; that is the statement you have objected to?—I state, from my knowledge of 28 years' experience in the profession, that I do know all about it, and he is not entitled to say I do not.

986. There was some misapprehension, was there not, about what you did say about the time you had served in the Metropolitan Fire Brigade after it was under the new management?—Yes, I said three or four months, whereas I should have said about a month and 12 days.

987. Captain Shaw was correct as to that?—He was correct there, and I was wrong in my answer; but without reference to dates, I believe I was right.

988. But you served under Mr. Braidwood up to the time of Captain Shaw joining the brigade?—You will find in my written story that I have given to the Committee, that I first joined the brigade as one of its youngest members. I passed

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passed through nearly every rank of promotion before Captain Shaw was a fireman. I was selected by the committee of the fire brigade for several specially important duties. I was again promoted and sent to Watling-street, and held the chief appointment there until Mr. Braidwood's death. I was in charge there at that time. At Mr. Braidwood's death I worked the brigade, and was responsible to the committee for its acts and duties, and after Captain Shaw was appointed I was kept there (as I felt) to instruct him in what had been so well done before. Captain Shaw had not been with us very long before he met with a severe accident, and I then took it up again and continued the work of the brigade until Captain Shaw was well again. I say it is not fair of him to say that I knew nothing about it, or the training of men after such long and distinguished services.

989. Might not Captain Shaw's statement have meant this: that under the new system under which the brigade was worked, you were not so conversant with it as you were with it previously?—I am obliged to you for that suggestion, and I am quite willing to accept it. I am much obliged to the Committee for affording me an opportunity of coming here to-day, as the publicity given to my statements will fully answer my purpose.

990. Mr. *Ritchie.*] I want to ask you a question or two about this Pantechnicon fire, because I cannot help thinking there must be some little misunderstanding about the time of the arrival of the engines there. I understand the difference between you and Captain Shaw to lie in this, that you said that you were present at the fire when the volunteer fire engine came up?—No, I could not have been, and I do not think I said so.

991. I will refer you to Question 7113; you are there asked, "Do you know how long the engines were before they arrived at that fire," to which you reply, "The first engine that arrived was a volunteer fire engine." The next question is, "Do you know why it was that a volunteer fire engine was the first to arrive? (*A.*) Because it was placed at a station close to the Pantechnicon. (*Q.*) And it was at that station that the first alarm was given? (*A.*) It was. (*Q.*) Did that engine get to work when it arrived there? (*A.*) I do not think so. (*Q.*) Were you present when that engine got there? (*A.*) I was busy inside the building, and I did not see when it got to work; but I know that the brigade engine from Pimlico came up almost as soon as that engine did, and it got its hose out, and as the plug was required for one engine the private engine was moved out of the way to make room for the public engine." Now that is the very thing which Captain Shaw took objection to in your evidence; he says that you were not present, and could not have been present when that volunteer engine came up?—I do not think I say in my evidence that I was.

992. You say, "I was busy inside the building"?—I do not mean to say that I was there when the engine arrived, because that engine was there I believe very shortly after the outbreak.

993. That is why I thought it right to put the question to you, because Captain Shaw implies, in answer to Question 8090, that you said that you were present when that volunteer fire engine came up. For example, Captain Shaw says in reply to Question 8091, "I wish to point out that the witness was asked, 'Were you present when the engine got there? (*A.*) I was busy inside the building, and I did not see when it got to work, but I know that the brigade engine from Pimlico came up almost as soon as that engine did, and it got its hose out, and as the plug was required for one engine the private engine was moved out of the way to make room for the public engine;' all that is wrong in point of time; Mr. Swanton travelled many miles to reach the fire; he states that he was busy in the building at the time alluded to; a volunteer fire engine was upon the spot for half-an-hour before our first brigade engine arrived;" the whole gist of that is that your evidence was supposed to go to say that you were present when that volunteer fire engine came up?—I do not say that I was there then, but I was speaking of replies I had received to my inquiries on the spot.

994. That is the misunderstanding; the answer would almost imply that you said you were present, because you say you were inside the building and did not see when the engine got to work, and then you go on to say that the brigade engine arrived almost as soon as the volunteer engine?—I can only speak to that from what I gathered at the time.

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Mr. *W. Swanton.*
26 March 1877.

995. Is not that the whole difference between you and Captain Shaw with regard to the Pantechnicon fire?—That is the only point, so far as the Pantechnicon fire is concerned.

996. And now with the light I have thrown upon it to you, you do not see any difference between yourself and Captain Shaw with reference to the Pantechnicon fire?—I do not, and think he need not have made so much importance of my answer.

997. Mr. *Herbert.*] Did your salvage corps save the whole of those carriages which were saved?—The salvage corps were the means of saving them in this way, the place was so full of smoke that no one but our people could have got near them. Our people got in the building, and attached ropes to them, and handed the ropes to the *employés*, who drew them out.

998. Did you see some soldiers going in and attaching ropes to the vehicles before you came up?—I do not think that anything was begun to be removed then. Our own people did really make fast 65 carriages, which the other people helped to pull out. I merely mention that to show that I was not late at the Pantechnicon fire, but that I must have been there very early after the alarm reached the City.

999. Mr. *Ritchie.*] You might have been very quickly at the fire after having received the alarm, but it might have been some time after the fire broke out that you received the alarm?—I do not know about that, but I was only anxious to let the Committee feel that I was not telling an untruth in my previous evidence, and without any previous knowledge of your questions I spoke as correctly as I could.

1000. Are you not aware that it was stated that the first alarm was given to the volunteer station?—Yes, I believe that was the case.

1001. And that it was some time before the alarm reached the Westminster Brigade Station?—That was so, in consequence of the call going the other way.

1002. You could only have been informed of it after the alarm had reached the Westminster Brigade Station?—Quite so. There is no doubt that through the alarm going to the Volunteer Station it was kept for some time from the fire brigade authorities.

1003. You might have been there very quickly after you were informed of the outbreak of the fire, but you might have been kept some time without being informed?—Yes, I have no doubt that was so.

1004. Sir *James M'Garel Hogg.*] I wish to know whether you adhere to your statement about the floats being late at the granaries fire, notwithstanding that I put in the report of the chief officer of the fire brigade which he received from the officer in charge of the D. float, in which he says it was only three-quarters of an hour from the first alarm before he got to work. Do you think that you know better than the officer in charge of the float?—You must really permit me to go beyond thinking. I am quite sure that my evidence about that was perfectly correct.

1005. What reason have you for thinking so?—These three or four corroborations which I have handed in.

1006. May I ask why you did not show this correspondence before, and why you did not make any complaint when the fire took place?—You will remember, I have no doubt, that a great many complaints were made to the Board of Works in consequence of it, and it was from that fire that the question of small floats came about. Mr. Lovell gave that in his evidence before this Committee, and I gave you copies of these corroborations.

1007. When was the complaint made that the floats did not come up in time?—At the first meeting of my committee after the fire occurred.

1008. What date was that?—Mr. Lovell's evidence will show when it was; the date of my report to the Committee is on the 14th of December 1871; there was a quarter of a million of money paid for that loss, and in consequence of the large outlay for the loss they addressed the Board of Works the same day, the 14th December 1871.

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Thursday, 12th April 1877.

MEMBERS PRESENT:

Mr. Clifton.	Lord Lindsay.
Mr. Forsyth.	Mr. Locke.
Mr. Hankey.	Sir Andrew Lusk.
Mr. John Stewart Hardy.	Mr. M'Lagan.
Mr. Hayter.	Mr. Onslow.
Mr. Herbert.	Sir Henry Peek.
Sir James M'Garel Hogg.	Mr. Ritchie.
Mr. Kinnaird.	Sir Henry Selwin-Ibbetson.

SIR HENRY SELWIN-IBBETSON, BART., IN THE CHAIR.

The Honourable *Spencer Ponsonby Fane,* C.B., called in; and Examined.

Hon. *Spencer Ponsonby Fane,* C.B.

12 April 1877.

1009. *Chairman.*] You have had a great deal to do with the theatrical history of London, as connected with the Lord Chamberlain's office, have you not?—I have been the controller or permanent secretary of that department for 20 years.

1010. You remember a Committee which sat in 1866 which inquired into the theatrical licenses and regulations?—I do.

1011. You remember the memorandum which you presented to that Committee with regard to the history of theatres as recorded in your office?—Yes.

1012. That was a correct description, I believe, of the history of the action of the Lord Chamberlain's department with regard to theatres?—It was up to that date.

1013. Since that date has any great alteration in the mode of action taken place?—The Committee of 1866 rather went in favour of free trade in theatres, if I may use that expression, and after that Committee sat the Lord Chamberlain became rather more lenient in granting licenses than before, but no other change took place whatever. I mean that the Lord Chamberlain acted upon the opinion of that Committee, that licenses might be granted more freely than they had been before that time. The policy had been rather restrictive previously.

1014. With respect to the mode in which the Lord Chamberlain grants those licenses; in your opinion could he refuse licenses with any justice in the present existing circumstances under which theatres within his jurisdiction are managed?—No; the present theatres are safe, so far as ordinary circumstances are concerned, that is to say, the audiences can leave them in six or seven minutes. I should say that that is quite the outside time required in any theatre in London.

1015. That is speaking with regard to all the theatres under the Lord Chamberlain's jurisdiction?—All the theatres under the Lord Chamberlain's jurisdiction. Of course circumstances differ; where people wait for their carriages, it takes them a longer time to go out. In rainy weather it takes a longer time than in fair weather for people to leave the theatre, because everybody puts up his umbrella at the door, but under ordinary circumstances, with people leaving in an orderley manner, there is no theatre in London which could not be cleared in seven minutes.

1016. You mean by that that the audience would be all out of the theatre itself in that time?—Yes, out of the auditory, and in safety so far as fire is concerned.

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Hon. *Spencer Ponsonby Fane*, C.B.

12 April 1877.

1017. Even though there were some of them that were not off the premises entirely, they would be out of the actual theatre, and in a part where a fire in the theatre would not affect them?—Quite so.

1018. With regard to this question of the safety of theatres, have you formed any opinion as to what their safety is, comparing it with the safety of other public buildings?—In my opinion wherever a large number of persons are gathered together in a building, the same risk exists, because the danger is not fire, it is panic arising from any cause. For instance, in the case which occurred in the United States the other day; I do not know whether any of the Committee noticed that.

1019. Are you referring to the Brooklyn fire?—No; the case to which I am referring was a panic in a Catholic church in New York in March last. An eminent preacher was preaching when a fainting woman gave a shriek and a succession of sobs, causing a profound sensation. At that moment somebody called out "fire," and a panic ensued, the result of which was that seven or eight people were killed.

1020. What you would represent is that the danger incurred is not so much from fire itself as from the panic ensuing from the dread of fire?—Quite so.

1021. And that risk is equally applicable to other buildings where the public congregate as to theatres?—Yes.

1022. Have the theatres which you are acquainted with in London under the jurisdiction of the Lord Chamberlain separate entrances for boxes, pit, and gallery?—There is no theatre in London which has not those three separate entrances, and most of them are very much in excess of that. I am not quite sure whether there is one theatre, but I think there is only one, which has not a double means of escape from each separate part of the house.

1023. Including the stalls?—Including the stalls. The stalls must be taken as forming part of the pit.

1024. That is that from all the different floors, as we may call them, upon which the audience assemble there are separate means of egress?—There are separate means of egress. Where there are two tiers of boxes there would be two means of exit for those two tiers; they must be taken as one.

1025. The upper tier of boxes would come down first to the gallery round a lower tier before they would reach the staircase?—Yes.

1026. In that case there would be two staircases, and two exits from them distinct from those which cleared the lower part of the house?—That is so.

1027. With regard to those galleries and staircases, have any regulations been in force with reference to the doors which form the exit from those places?—The Lord Chamberlain has for many years past carried out an annual inspection of theatres, in which the greatest possible care is taken to look at every one of these points, such as the doors swinging both ways, or opening outwards; the removal of all obstructions; the water supply, and all matters which tend to the safety of a theatre and the audience.

1028. And those are points upon which the Lord Chamberlain, as I understand, insists in the construction of all new theatres?—In new theatres of course very much greater attention is paid to those matters than formerly. The requirements of the public are now very much greater than they were in former times.

1029. The license is an annual license, is it not?—Yes.

1030. Does the Lord Chamberlain, in renewing a license to an old theatre, enforce the suggestions which he considers necessary in a new one. As I understand your previous answer, you say that when an application is made for the erection of a new theatre, following out the memorandum and suggestions which have since been made, certain things are suggested as necessary for its construction, such as appliances for water supply; that the passages should not have angles in them which should prevent egress, and that the doors should swing both ways. I now ask you whether, with regard to old theatres, not applying for construction, but for the annual renewal of their license, compliance with those suggestions is made a condition of the renewal?—So far as possible it is.

1031. That is to say, the construction of those theatres in many instances renders it quite impossible, as long as they remain upon their present site, that some of those suggestions can be complied with?—Quite so.

1032. In

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1032. In the Theatre Act of the 6 & 7 Vict. c. 68, was there any provision with regard to the construction of theatres?—None whatever.

1033. The manager was held responsible, was he not?—The 7th clause enacts "That no such license for a theatre shall be granted by the Lord Chamberlain or justices to any person except the actual and responsible manager for the time being of the theatre in respect of which the license shall be granted, and the name and place of abode of such manager shall be printed on every playbill announcing any representation at such theatre." That is to make him actually responsible for what takes place within it.

1034. Many years ago, I believe, some of the theatres were far more dangerous than they are at the present moment; improvements have been introduced of late years?—In the early days of my office I passed many sleepless nights on that account, but the theatres have all now been made fairly safe under ordinary circumstances; that is in any case except of panic.

1035. But in renewing a license I understand the Lord Chamberlain has not thought it necessary to require the rebuilding of a theatre on account of any of those faults, but has required improvement in those respects as far as was possible?—He had no power under the Act to do so.

1036. Except with regard to the refusal of the license?—Except the negative power of refusing a license.

1037. The Lord Chamberlain has not felt justified in refusing a license on those grounds?—No; because they have been considered safe under ordinary circumstances, and it would be impossible without entire re-construction to comply with those requirements.

1038. Have you found in carrying out those amendments of construction that the managers have been amenable at all to the suggestions from your office?—They have always been most anxious to carry out any suggestions of the Lord Chamberlain's, but they have not always the requisite means at command, and therefore a difficulty has arisen upon some occasions on that account.

1039. The Committee of 1866 I do not think, so far as I remember, went into the question of safety to any great extent; the Committee principally dealt with the quarrel between the theatres and music halls?—The inquiry was principally directed to the performance of small pieces and ballets at music-halls; and the consumption of spirituous liquors and refreshments at theatres.

1040. I believe that Committee recommended that all those buildings in London where public entertainments were given should be placed under the Lord Chamberlain, did it not?—Yes.

1041. Was anything done as the result of that Committee?—In the following year a Bill was drafted to carry out the recommendations of the Committee upon a principle of applying the fees to pay the expenses of inspectors and various other officers who might be required; but on going into the matter, the details showed great difficulties. For instance, among other things, some 600 or 700 places would have been placed at once under the Lord Chamberlain's jurisdiction within the area of the metropolitan police district, many of them unsuited for the purpose for which they were intended: they were adaptations of rooms and meeting-houses, and various other places, and it was found impossible to carry the principle out. During the whole of 1867 and 1868 communications took place between the Lord Chamberlain and the Home Office upon the subject, and eventually the Bill was dropped.

1042. The Bill was never introduced, was it?—The Bill was never introduced.

1043. But I understand that the Lord Chamberlain's regulations have dealt with those older theatres as well as the newer ones which have been constructed?—As far as possible all precautions which could be taken have been taken.

1044. I believe you inspect those theatres annually before the licenses are renewed?—Before the licensing day, the 29th of September; that is to say, during the months of August and September I go, accompanied by the examiner of plays and a professional surveyor, to every theatre in London. We go from garret to basement, and there is no door, no room of any sort or kind used by the public which is not inspected, besides the chandeliers, the gas-fittings, and the cellars, and also the water supply.

1045. As I understand, that takes place at a time when a theatre is empty; do you also inspect a theatre at all when the audience are there?—It has occa-

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sionally been done, but not as a rule; in fact, the inspection could not take place when the audience are in the theatre.

1046. Whilst a play was going on there would be no possibility of going through the place as you wished to go through it, to ascertain what is actually going on?—No.

1047. I suppose public attention having been more directed to this matter, the public requirements are now greater than they were formerly?—Very much more so.

1048. Does that suggest to your mind the necessity at all that there should be some responsible officer appointed to look into this question of construction?—The Lord Chamberlain considers that his powers under the Act of Parliament are not sufficient to enable him to meet the responsibility which the public are now attempting to throw upon him.

1049. That is, that having simply the power of refusing the license, which is a very strong measure, and stopping a theatre altogether, the Lord Chamberlain has no power of throwing out suggestions which may seem necessary, either as regards their construction or other matters connected with them?—In reference to the word "necessary" I should hesitate. All ordinary requirements are certainly carried out, but any extraordinary thing like the reconstruction of a theatre, the Lord Chamberlain could not fairly require under his present powers.

1050. The Lord Chamberlain has no staff, has he, to undertake such a duty?—He has no staff except the few clerks in the office, and you will remember also that those clerks are paid from the Civil List; it is not a public department.

1051. I suppose that what the Lord Chamberlain feels, namely, that some responsible officer should deal with matters of construction, would imply that he should deal not only with the construction of theatres but generally with music halls and all other places of public amusement?—Quite so. You could not justly apply the regulations to theatres alone.

1052. And therefore you would gain in that you would have universal inspection over the construction, whilst at present under the Lord Chamberlain's office, from the want of staff, there is power, but only a limited power over a limited number of theatres?—Quite so; the Lord Chamberlain's opinion is that there should be a department charged with the inspection of all public buildings, paid by the public, with a staff of inspectors.

1053. If that were done would you be content that that should be applied to theatres alone?—No, other places are quite as dangerous as theatres in case of panic.

1054. Have you thought whether you would suggest any penalties which should be enforced for breaches of the rules, such as placing seats in the gangways, or other obstructions?—Those are matters with which the public ought to be enabled to deal themselves.

1055. Would you make doing such things as that a police offence?—I would make them a police offence or misdemeanour, with a penalty of, say, 5 *s.* for the offence. The withdrawal of a license because a chair was placed in a gangway would be a very severe punishment, and quite out of all proportion to the offence.

1056. In your opinion there should be some ready method of punishing the infringement of such a regulation without waiting until you come to the severer punishment, and using it, of taking away the license?—Quite so. I might inform the Committee that last year, after the Brooklyn fire, when the public were very much excited upon the subject, the Lord Chamberlain issued a most stringent regulation with regard to the practice of placing chairs in gangways, and I believe it has been stopped almost entirely.

1057. To your knowledge is the practice universally stopped?—There have been no complaints for a very long time past upon the subject. I must say that the public are to blame in that matter as much as the managers of the theatres, because they always insist upon a chair for themselves whenever they go late. I mean if a member of the Committee went late to a theatre, and found no place vacant, he would probably tip the boxkeeper to supply a chair.

1058. What made me suggest the question as to whether you were sure it was universally carried out was, that the last time I was at a theatre I saw the act done

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done in the very way you have described, but not I should add by myself. However you would suggest that by making it a police offence so that anybody could take action in the matter, you would get a sufficient security?—I think that the honourable Member who accepted the seat and the boxkeeper should both be given into custody.

1059. I think that before that Committee of 1866 Captain Shaw gave evidence, and suggested, as far as my recollection goes, that there might be some firemen attached to the theatres, following out the principle of the *sapeurs-pompiers* in France, who have control, to a certain extent, during the time that the audience are in the theatre; have you considered that point at all?—I think Captain Shaw's evidence does not quite bear that out; he was of opinion that there should be firemen in theatres.

1060. I have had placed in my hand a book entitled "Fires in Theatres," published last year by Captain Shaw, in which the following passages occur, that "supplying a fire watch from a public fire brigade as on the continent, being perhaps the best mode of all, might perhaps be taken first"?—That no doubt was so in his book, but I was referring to his evidence in 1866.

1061. Captain Shaw states in his evidence in 1866, that each theatre in Paris is under the charge of a *sapeur-pompier*, and then he states that the theatres cannot open without a certificate that the necessary conditions have been complied with, and that the authorities can stop any part of the performance which seems dangerous; now with regard to our own theatres, have you considered any action of that kind being taken as unwise or the contrary?—The only objection that I see to it is, that you would relieve the managers from the responsibility, which is a most important thing to preserve; that you would make a public officer responsible for the safety of the audience, relieving the manager to that extent from the responsibility. If an accident occurred, that public officer would be the person to blame, and the public officer would become liable to pay for damages under those circumstances, thereby relieving the manager from that responsibility.

1062. At present, as I understand, the manager being responsible, all his servants are, or ought to be, firemen to a certain extent, and would be more useful in such a history as goes on during the performance than the one or two firemen who might be in the building?—Certainly in every theatre there are men charged with the duty of looking after the fire appliances, but in addition to that ever carpenter and "super" is a fireman to a certain extent.

1063. That is to say, he is close to the spot where the fire breaks out, and is more likely to be able to stop it in the first moment than if he had to wait to call a properly constituted fireman with his appliances?—Quite so. Mr. Nelson Lee, who was examined before the Committee in 1866, having had a great number of years' experience in this matter, said to me, "The carpenter's cap is the great safety in a theatre, because he takes it off and knocks out a fire the moment it occurs."

1064. I suppose that in some cases of crowding, such as pantomimes, that is a matter which is even of more importance, because one man could not be attending to every one of the flys where a fire may take place?—Quite so.

1065. Has your attention been directed to what has been suggested in letters to this Committee from inventors with regard to a wire or iron curtain separating the stage from the audience?—Yes, constantly. Captain Shaw called attention to the matter in 1866 in the first instance. At that time revolving iron shutters, such as are used in the shops were suggested as a separating curtain, but were found to be ineffectual. Then there was a solid iron curtain suggested; the weight of that makes it impossible to apply it. In the French theatres they have a wire gauze, something on the principle of the Davy lamp on a larger scale; but I am told that that is not effectual; that it buckles up very much in the same way as the others.

1066. Mr. *Forsyth.*] Has a fire taken place in a theatre in France since that has been tried?—I believe there has in one instance.

1067. *Chairman.*] You are not able to speak with reference to whether it was of assistance or effective?—I speak on the authority of a letter published by Mr. Boucicault, in which he gives an instance of it.

1068. But supposing a fire to take place, for a moment it is unknown to the audience;

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audience; and supposing that shutter came down suddenly, might it not produce that very panic which you dread?—It would probably produce the very danger of panic which you want to avoid.

1069. The object being to get the audience out quickly and quietly, there is generally time to do that before anything serious could happen?—Yes.

1070. That leads one to suggest rather the security of the walls and passages, and the size of them, than anything like a screen between one part of the theatre and another?—It might be applied in new theatres, but I do not myself attach the great importance which has been attached to it by some people.

1071. Do you think that in any future regulations the solidity of the proscenium walls should be a part of the necessary obligation of construction?—I do think that it is a very important point to have a solid proscenium wall, more particularly over the top of a theatre.

1072. Do you think there would be any difficulty in applying that now to the existing theatres?—To some of the old theatres it would be impossible to do so.

1073. For what reason?—That they have not the foundation to go upon.

1074. Then you would have, practically, to reconstruct the whole theatre on account of the insufficiency of the foundation?—Yes, but a solid wall does exist in many theatres.

1075. Has your attention been called to what was placed before the Committe by Mr. Penrose as to the material which he has applied to the roof of St. Paul's, and which he states to be absolutely protective against fire; "stonefelt" he calls it?—I have not heard of that particular substance, but various inventions for that purpose have been reported upon very often. As applied to a roof, I am not sure what their value would be.

1076. Mr. Penrose stated that this was an invention which had not been out very long, a few years, and which he had tested so satisfactorily as that when he stood upon the floor above the furnace, which was lighted, there was no perceptible heat through the floor, which was made of this material, about nine inches in thickness?—I have not heard about that.

1077. And Mr. Penrose gave evidence to this Committee that in his judgment as an architect, the galleries of theatres constructed in this way, or the proscenium walls constructed with this material, would absolutely limit a fire to the place in which it began, and would make those walls and galleries an effectual protection against fire?—The question would be whether it could be applied to existing structures.

1078. It was a material built up like concrete with which the existing walls could be overlaid, but it has not been brought to your notice?—No.

1079. Now supposing a new Act were passed altering the existing law upon the subject, what would you suggest should be the course adopted; should the Lord Chamberlain's license be maintained?—There should be a department to superintend all public buildings as a structure; and the Lord Chamberlain's license should be preserved, but it should be dependent upon a certificate from a department which has the means of examining those public buildings.

1080. You would place all public buildings where entertainments of this sort were carried out under a department which should be responsible for their construction, and that on a certificate from such a department coming to the Lord Chamberlain's office, his license would issue if satisfactory?—Not necessarily, but that without it, it should not issue; it should be upon somewhat the same principle as the Board of Trade applies to railways.

1081. When that certificate as to the proper construction was submitted to the Lord Chamberlain, you would allow him to refuse a license, or to regulate it by rules and regulations before the license was granted?—Yes; that part of the subject would be with regard to the character and responsibility of the manager.

1082. You would retain the censorship over the pieces?—That would remain as before; that would not be affected by these suggestions.

1083. Would you have those rules defined and laid down?—The Lord Chamberlain should be enabled to make rules from time to time, because circumstances arise which make it necessary to alter them, and there should be some

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some power to enforce them, which there is not under the Act of 6 & 7 Victoria.

1084. An honourable Member has referred me to a question which was asked of Mr. Penrose, as to whether this material of which Mr. Penrose was speaking, could be adapted to the present buildings; whether you could overlay a wooden floor with the material; to which he replied, "Certainly, that is done in our present work at St. Paul's; the landings are wooden floors, coated on the top and bottom with this material," Mr. Penrose having previously stated that it rendered it absolutely fire-proof?—We have had a very large number of inventions, all represented as effectual, sent in to us from time to time.

1085. At the same time, Mr. Penrose's evidence shows that he felt that it was effectual, or else he would not have dealt with a building like St. Paul's, which was under his charge, in that way?—I only meant my reply to show the difficulty of deciding between them.

1086. I think you stated that, in your opinion, now the modes of egress were practically sufficient in most of the theatres?—They are, under ordinary circumstances.

1087. Do I understand you to say that, since 1866, great improvements have been made in that respect, because I see Captain Shaw, in his evidence, answered a question which was put to him upon that point by saying, "The means of egress are not, in my opinion, sufficient in any of the theatres"?—That was his opinion.

1088. What I wish to know is whether, since that opinion was expressed by Captain Shaw, who, of course, has some knowledge upon the subject of fires, alterations have taken place in consequence of your supervision of theatres?—There have been improvements made; improvements have been constantly going on and are still in progress in every theatre.

1089. Are there a good many theatres which have sprung up since that time?—There have been 14 new theatres erected since 1866.

1090. And in those cases the license has not been granted until you have satisfied yourselves upon these points?—Quite so.

1091. So that we may take it that, in a large number of theatres, improvements have taken place upon the state of things which suggested that answer of Captain Shaw?—Yes.

1092. Captain Shaw stated that it was of absolute necessity in his opinion that, even if the size of those buildings and theatres had to be reduced, he should never omit passages round, which should give ample space for more than one person to pass; is it the condition of things now in any of the theatres that the galleries are too narrow for two people to go through abreast?—Not the large passages through which the public must necessarily pass; some of the inter-communicating passages are very small indeed in some of the theatres.

1093. What you would tell the Committee is that in case of a fire or emergency, apart from these narrow passages, there are openings direct from the front part where the audience are assembled which they could avail themselves of without having to go through these narrow passages?—Yes. Take, for instance, the Prince of Wales's Theatre; it is a very small theatre, and a very old one; the stalls did not exist at all in the theatre when it was built; they are an addition made to meet modern requirements. The entrance to the stalls is naturally put where the better class of people enter the theatre; that is to say, where the box entrance is; therefore, in order to reach the stalls, the public have to pass by the boxes, and to go through necessarily narrow staircases, because the theatre is small, into the stalls; but some years ago Mr. Bancroft made a door opening direct into the street, through which the whole of the stall audience might go out in certainly less than one minute.

1094. Is that door kept open at the time of the audience going out, or is it only open on an emergency?—There is a placard put upon it, saying, "Push this door, and you will go into the street," or words to that effect; you have nothing to do but push it, and it goes out direct into the street; it is actually on the street, so that you are at once in the street.

1095. So that without necessity the audience prefer going the other way on account of having to go to their carriages, and having some place to remain in whilst their carriages come up?—There is no place for waiting there, because

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the egress is directly into the street, and therefore those having carriages prefer to remain under cover until the carriages are called up.

1096. That door has been there placed for the convenience of the audience?—It has been there for the last six or seven years.

1097. Mr. *Clifton*.] Is there no lock upon it?—It is locked, so that it cannot be opened from the outside, but you have nothing to do but to push it from the inside, and you are right in the street.

1098. *Chairman*.] That is with regard to the Prince of Wales's Theatre; of course I am speaking in ignorance, but from having been at it, I think it is the Opera Comique where you go down to the depths of the earth before you arrive at the theatre; you pass through a long passage?—I will explain the circumstances of that theatre. It is one of the most fortunately placed theatres in London, because it actually stands between two streets, perfectly clear on each side; Wych-street on one side, and Holywell-street, or Booksellers'-row, as it is now called, on the other. When the plans were sent in for a license, there was one large box entrance into Booksellers'-row, and there were three good entrances on the other side in Wych-street, and the theatre was opened for some time under those circumstances. After that, the manager came and inquired if there would be any objection to his making an entrance in the Strand, by making a tunnel under that row of houses which stands between the Strand and Booksellers'-row, and as that was made in addition to the other entrances the Lord Chamberlain did not object to it. I must point out to the Committee that it is under ground; that it is fire-proof; people might be drowned there, but certainly they could not be burnt.

1099. I suppose the only danger there would be the danger of being crushed from panic?—There would be the danger of being crushed.

1100. Then though it looks very unsafe, you believe that it is an additional exit, and is practically not an unsafe one?—It is an additional exit to the others.

1101. With regard to what has often been stated that those theatres are at present, from the wings and under the stage, and the places where old materials are stored, simply bonfires waiting to be lighted up; do you go into those places?—Every one of them, and we always strongly advise the removal of superfluous stores of all kinds, but in all theatres there are immense quantities of "properties" which are absolutely necessary for the various performances of plays, which are changed from time to time.

1102. Are any regulations insisted upon with regard to the storage of these properties?—As far as possible the removal of all superfluous stores is urged constantly upon managers, for their own sakes as well as for the safety of the public.

1103. Would it be possible so to construct the places where those stores are kept with brick arches as to make them fire-proof?—Certainly in new theatres.

1104. That would be a precaution which would be advisable?—So as to divide the risk, as Captain Shaw recommends in his pamphlet. In one of the theatres in London, the Gaiety, the property rooms extend under the audience part of the house, and they are all upon brick fire-proof arches.

1105. And there if a fire did arise it would in all probability be limited to the space in which it began?—It would for a time, no doubt.

1106. What made me ask the question was that whenever you hear of a fire in a theatre it is always so rapid in its course that one imagines it arises very much from the fact that all the places opening into each other, none of them being fire-proof, a small fire lights up the whole inflammable material all over the place?—That is so.

1107. What I wished to ask was, whether there might not be some such construction of brick arches as to separate all those loose properties from the theatre itself?—It is absolutely necessary that these properties should be available for rapid conveyance backwards and forwards to the stage, and that is the great difficulty. In the French theatres they are bound to have their workshops and store-rooms apart from the theatres, but the Committee will see that that would be difficult in London where space is not to be procured.

1108. The limit of space practically prevents anything of the sort, because having

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having to mass all these properties into a small space, and yet keep them available, they have to get that space underneath and above their working space?—Yes. When a pantomime is being performed, the amount of properties required for the performance, is something almost incredible; at the end of a scene they have all to be rapidly conveyed off the stage to make room for another scene involving a number of properties equally incredible; a theatre must have places available for storing all those things from time to time.

1109. That seems to point more to limiting a fire, if you can, to the acting part proper?—I do not say that these store-rooms might not be built upon arches or with fire-proof materials. I think in any new theatre it should be done.

1110. That would be the advantage of some such system of regulation as you suggest, that where a public authority had to be satisfied as to construction, some regulations with reference to fire-proof materials might be laid down?—Certainly, but that could not be applied to the old theatres.

1111. With regard to that question of a public authority, have you considered what that authority should be; whether it should be a local authority who should be satisfied, or some official appointed for the purpose?—It would require a regular department, with inspectors to visit the various theatres all over the country.

1112. You do not think that it would be sufficient to entrust the Metropolitan Board of Works, or the City authority, or some local authority of that sort, with the power of satisfying itself that measures of safety had been complied with in the construction of the buildings?—I think it should be a Government office, and extend to every part of the United Kingdom.

1113. Then what department would you suggest it should be under; the Board of Trade, for example?—The Board of Trade deals with railways and manufactories, I believe; but I am not sufficiently acquainted with the working of the Board of Trade to be able to answer that question.

1114. What you would suggest to the Committee as from the Lord Chamberlain's office is that, with regard to the construction of all these buildings, some public officer should be appointed who should satisfy himself as to the construction of a theatre before a license was applied for to the Lord Chamberlain?—Yes, that the Lord Chamberlain should be relieved of the responsibility of the construction of theatres in every way.

1115. And that he should still retain the other powers with regard to the license which he at present possesses?—Yes.

1116. Do the pieces which are acted at music halls come before the Lord Chamberlain?—No, not in any way.

1117. If you placed music halls and theatres under this public officer for the purpose of construction, would you suggest that under those circumstances they should be all placed under the authority of the Lord Chamberlain?—Do I understand the question to mean that all the pieces performed in music halls should be brought before the Lord Chamberlain.

1118. That the licenses should be granted by the Lord Chamberlain upon the receipt of a certificate of construction in the same way as with regard to theatres, and that whatever regulations you would consider necessary with regard to the one should be extended to the other?—Certainly, the new authority should look to the construction of all places of public recreation.

1119. It being the case, therefore, that you would place music halls and other places of amusement under the same terms as the theatres are, under the Lord Chamberlain, I wish to know whether you do not think they ought to be under the Lord Chamberlain, for the purpose of licensing and regulation?—That would be difficult, in consequence of the very large number of them.

1120. Do you say it would be difficult to carry out?—Yes; it would be difficult for the Lord Chamberlain to grant licenses for all those songs and performances which take place in the very large number of places of public amusement which are not theatres; that is what I mean.

1121. Would you limit their being placed upon one footing merely to the fact of inspection of construction?—Merely to inspection of construction.

1122. Would you leave them in the same position as they are now with regard to all the other conditions upon which they carry on their business?—Yes.

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1123. Do you think it would be advisable, or do you mean that you do not wish it?—It might be advisable, but it would be difficult to carry out.

1124. It might be advisable to make them liable to the Lord Chamberlain with regard to licensing and regulation identically with theatres?—Yes; it might be advisable, but it would be very difficult for the Lord Chamberlain, because he has not a sufficient staff to visit all those places, and to see that all the conditions of the licensing regulations were carried out.

1125. Is there any other point which you would wish to suggest to the Committee upon this question which has been submitted to it, with regard to the better protection of theatres and places of public amusement from fire?—No; I think I have brought forward every question which suggested itself to me.

1126. I understand that the Lord Chamberlain has no power to interfere, supposing a report is made to him with regard to a music hall, or anything imagined to be carried on improperly?—He has no power to interfere with regard to any building which does not receive a license from him.

1127. At present his licensing power is limited to the theatres of London?—His licensing power is limited to the theatres within the metropolitan boroughs of the Reform Bill of 1832.

1128. And although you state to the Committee that you think it advisable that his power should be extended, you do not think that his staff would enable him to carry out his duties properly?—It would have to be very considerably extended to do that.

1129. Mr. *Locke.*] Do you think that there is a difference between the French theatres and those which we have in England?—I have not been in Paris for a good many years, but they were very bad formerly.

1130. But have they not this advantage, that the theatre is upon the ground, and not under it, in France?—I think, if I remember rightly, the Palais Royal Theatre is elevated above the ground very considerably.

1131. Is it not so throughout in all the theatres, that they are on the ground?—I have not been to Paris for some years past, and I cannot say.

1132. Perhaps you know that in London a great many of the theatres are under ground?—Not a great number of them.

1133. How many of them are there under ground?—There is one.

1134. Are there not more, four or five sunk below the ground?—There is one which is absolutely below the ground, and that is the Criterion.

1135. Do not you think that that is a dangerous thing?—No, I do not.

1136. You think a person when he is under ground gets away as well as when he is above it?—It depends upon where he wants to go.

1137. If he wants to get out of a theatre on fire, do you think it is a benefit to be under ground, when otherwise he might step out of the place into the street?—No, I do not say that.

1138. Do not you think it is a very bad course to adopt, to put a theatre under ground?—It depends upon the circumstances of the case.

1139. What are the circumstances of the case?—The circumstances of the case of the Criterion Theatre are, that it is one of the best theatres in London.

1140. In what respect?—In regard to safety and to ventilation.

1141. With regard to ventilation that is another thing, but supposing there is a fire there?—The whole audience could be lodged in the approaches to the theatre out of danger of the fire at once.

1142. In what way?—Because the area of the entrances is larger than the theatre itself, and they are all perfectly fire-proof.

1143. Supposing a person is in the pit, what then?—If a person is in the pit he can in one moment pass into what you may almost term a separate street. There is a fire-proof passage leading to the pit, and the pit abuts directly on to this passage, and that passage would hold not only the pit audience, but the whole of the audience of the theatre. Above that there is one equally available for the gallery, and equally capable of holding the whole audience; the exits are extremely good in that theatre.

1144. And

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1144. And what are they built of?—They are built of fire-proof materials and stone; there is nothing inflammable in them.

1145. Then you find, as regards the exit from all these places, that they are safe?—Perfectly safe.

1146. That is a novelty, is it not, with regard to this theatre; that is the only one that is in that condition?—That is the only theatre which is built under ground. I may say that at this time the theatre is very full, and I sent last night to take the time of the audience leaving the house. The auditory was perfectly clear in four minutes.

1147. What is the width of those passages, as you call them, round the pit?—I could not say off-hand, but the passages are, to the best of my recollection, 7 or 8 feet wide. I only speak from recollection.

1148. Now with respect to the other theatres which were built before this one, will you tell me what the width of those passages is which have been placed there for the purpose of getting out?—They all differ so much.

1149. Do they not differ very much indeed from that theatre which we have been speaking of, namely, the Criterion?—Their situations are so different.

1150. Are they not exceedingly narrow?—There are narrow passages in them.

1151. No two persons could proceed side by side in any one of them to get out?—Yes, they could.

1152. Which of them?—In all of them.

1153. They are under ground?—I do not admit that.

1154. Do you say they are not, any of them?—Some of them are below the level of the street, but they are not altogether under ground. If you would tell me which theatre you refer to I could, perhaps, answer the question.

1155. I think there are three of them near the Temple?—You perhaps refer to the Opera Comique and to the Globe Theatre. Those two theatres are, to a certain extent, under ground; that is to say, the pit is below the surface.

1156. There are more people in the pit than anywhere else, are there not?—But the pit exit from the Globe is excellent.

1157. In what respect?—The entrance to it is very close to the street, and very wide; and there is a point which I might mention to the Committee also, that the exit from it is up a staircase of 12 or 14 steps instead of being down a staircase. I think that is safer than if it was down a staircase, because the audience would not tumble over each other as they might in going down. That is a point which was considered when the license was granted to those two theatres.

1158. Do not you think that if there were a number of them getting up they would not all get up this narrow staircase?—It is not very narrow.

1159. What width is it?—I think, speaking from recollection, it is six feet wide.

1160. It appears to me to be very much narrower than you have stated?—Some are narrower than others. In the smaller theatres the side passages are necessarily narrow, but the general entrance is, in all cases, of good width.

1161. In the theatres, when people get out of the theatre, in what way do they do it; they have not different places to go out of the theatre, have they, but only one?—Yes, all of them; there is no theatre in London in which there is not a separate exit for the box audience, for the pit audience, and for the gallery audience.

1162. Sir *Henry Peek.*] And stage entrances besides?—And stage entrances besides.

1163. Mr. *Locke.*] How would that be when there are houses on each side of the theatres, and at the back too?—There are none that do not fulfil that condition which I have mentioned. Take, for instance, those theatres that abut upon the Strand, the Strand Theatre, for example, which is a little theatre not far from the Temple, the box and stall entrance is in the Strand, the pit, gallery, and stage entrances are in Surrey-street.

1164. Take the Adelphi Theatre; how is that?—The Adelphi Theatre has a very fair frontage. I suppose it is 12 or 14 feet wide; that frontage is divided by a railing; half of it is apportioned to the boxes, and half to the pit; besides that, there is a court which runs up alongside of it, on the east side, where

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the gallery entrance is, and the stage entrance, and besides that there are two large escape doors, which open direct from the theatre into that court.

1165. That is not under ground?—It is under ground to a certain extent. If you remember, in that part of London the level varies considerably; from the back of the Strand down to the river, I should think there was 40 feet fall, so that what is level to the street is below the ground at the back.

1166. But I am speaking of the theatre which is upon the ground, is it not?—The pit is below it, as its name indicates.

1167. To what extent?—It is upon a level with the street in front, but in the court the ground rises.

1168. That was one of the older theatres, was it not?—That theatre was built 20 years ago; it was rebuilt then.

1169. It was built upon the ground in the same way as it was before?—It was extended and very much enlarged; what I would say is, that although it is level to the ground in front, the ground rises behind it and so you would have to go up steps from the pit to get to the court.

1170. But some of the theatres are under ground?—There is only the Criterion which is positively under ground; the Globe and the Opera Comique are under ground as far as regards the pit, but the boxes are on the level.

1171. Do you not think it is a very dangerous thing?—I do not, as I have explained.

1172. Supposing a place is on fire, is it not a dangerous thing for the people to be rushing up from the pit in that manner?—I think not.

1173. How many places are there to get through out of the pit; there is only one exit, is there, on each side?—There is only one in ordinary use; I do not quite know which theatre you allude to; each theatre differs from the others.

1174. I refer to the Criterion?—The Criterion has one exit from the pit, but the other staircase is equally available.

1175. That is the only one that is used?—It is only one used for the pit.

1176. But you have never found out the exact size of it?—I have the dimensions at home, but I cannot say now. The exit from the pit at the Criterion is seven or eight feet wide, I believe.

1177. Are you aware that the theatres in France have not houses up against the greater number of them, as you say is the case with these theatres in London?—No.

1178. Have they not houses by their sides in London?—Yes.

1179. And behind too?—Yes.

1180. Close up against them?—Yes.

1181. Does not that cause the fact that there are very few places in a theatre for the audience to get out, supposing there is a fire?—It is not the case, as I have informed the Committee; there is no theatre in London which has not three or four separate exits.

1182. How can they manage that with the houses up against them?—There is only one theatre which is entirely inclosed.

1183. Are they open at those places?—Not at the back, not against the other houses.

1184. Nor at the sides; if the people cannot go out at the sides or out at the back, they must come out at the front?—There is only one theatre in London where that exists.

1185. Which is that?—The Charing Cross Theatre, but that has a good frontage, and there are, I think, three separate exits there.

1186. *Chairman.*] Are all those exits on to the street?—Yes, but it is a very small place.

1187. Mr. *Locke.*] You say you cannot tell the Committee what the width is, or the height of the exit from the pit and other parts of the theatre through which persons might rush, supposing there were a fire in the theatre?—I could tell you by going off and fetching the plans of the theatres. I believe I have the plans of every theatre in London built within the last 20 years, but not of all the older theatres; they are very voluminous, but each particular theatre has been considered on its merits before the grant of a license.

1188. You think it is beneficial to have these theatres under ground?—I think that under certain conditions there is no objection to it.

1189. Covent

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1189. Covent Garden and Drury Lane are open all round; all round the theatre there is a way of getting out, is there not?—Yes, plenty.

1190. Both of those theatres have been burnt to the ground and nobody was burnt in them?—I believe nobody has been burnt in a theatre in England within the last 50 years.

1191. The people have had an opportunity of getting out when the theatres were on fire?—Yes; at Drury Lane and Covent Garden certainly they had.

1192. What are the alterations which you propose to make in those theatres which are built now?—I should wait to hear what this Committee reported.

1193. You would not build them in the same way that those have been built recently?—If the ground could be provided of course it would be a very great benefit that the theatres should be clear on all sides, but it is not very easy to find the ground.

1194. Do not you think that when a theatre is built, it ought to be in that position that it should be clear all round?—It would be a great benefit if it was, but I am afraid it would restrict the number of theatres very much; in fact that observation, I need not say, would apply not only to theatres, but to all places of public entertainment.

1195. Mr. *Forsyth.*] Do you remember reading some years ago an account of the terrible catastrophe which happened at a church in Santiago, in South America?—Yes.

1196. I believe it was not so much the fire which destroyed life there as the crushing and crowding from the panic?—Yes, that was so.

1197. If you remember, the crowd of young girls were so packed together in the passage that they blocked the whole entrance and died from the pressure, and then those behind in the church were burnt?—That was very much under the same conditions as the audience were burnt in the theatre at Brooklyn the other day.

1198. Is it not a matter of the first importance with regard to escape under panic arising from fire or any other cause, that the passages should be wide and the doors wide also?—Yes.

1199. Do you think, taking the theatres generally under the supervision of the Lord Chamberlain in London, that the passages and doors are sufficiently wide?—If the theatres were to be rebuilt it would be of course advantageous that the passages should be wider, but as I have stated to the Committee, the Lord Chamberlain has not thought it his duty, considering that they are safe under ordinary circumstances, to order them (in fact he could not order them) to be pulled down and reconstructed.

1200. But you have stated that it would be better and more safe if they were generally wider?—Certainly.

1201. You have been asked in reference to chairs in gangways. Are notices put up in theatres that the public are not to ask for chairs in the gangway?—No, I think not.

1202. Ought not that to be done; ought not people to be told by placard that they must not ask for them?—That would be an order to the public; that would rest with the manager if he thought proper.

1203. Would it not be advisable for the Lord Chamberlain to suggest to the managers that it would be proper to put up such a placard?—Yes, I think that might be done.

1204. Mr. *Hayter.*] Has the Lord Chamberlain no power of enforcing any regulation he may issue except the refusal or the withdrawal of the license?—No other authority whatever.

1205. And no other authority has the power either?—No.

1206. Mr. *Hankey.*] Has the Lord Chamberlain the power of withdrawing the license?—No, he has no power of withdrawing the license except as is laid down in the Act of Parliament, for riot or misbehaviour.

1207. And not on account of any faulty construction of the place after it has been once licensed?—No, there is no power of withdrawing the license except for misbehaviour.

1208. Mr. *Hayter.*] Would there be any width of passage required before granting a license to a newly built theatre?—It has never been thought advisable

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to lay down any special rule on the subject of width, but in any new theatre the passages would be required to be at least four feet wide; in fact, the large passages for the general exit of the audience would be required to be much wider than that.

1209. That would be one of the considerations which the department would take account of?—Certainly.

1210. But as I understand your evidence that regulation cannot be practically enforced in the older theatres, because that would involve their reconstruction?—I must explain to the Committee that in a theatre there are many passages, some of which are used by a large number of persons, and others, which communicate only with a small portion of the house; those passages which communicate with only a small portion of the house are not required to be as large as the others. For instance, some communicate only with the private boxes, and not above 10 or 12 persons use those passages, so that if you lay down a rule that such passages should be four feet wide, you would be using up space which might be better used for other purposes.

1211. That door you alluded to at the Prince of Wales's Theatre is only used for the stalls?—That is so.

1212. Is there any notice to the public in the Prince of Wales's Theatre with regard to this exit?—There is on the door, and if I mistake not on the programmes also.

1213. I mean inside the theatre?—Yes.

1214. Mr. *Herbert.*] Do you not think it would be advisable that there should be written up in some conspicuous place in the front of the theatre where these different exits are?—Yes, I think that a very good plan. I have suggested it on different occasions, but managers take into their own hands anything of that kind.

1215. Do not you think that these orders should be insisted upon; that it would be a very simple thing to do. For instance, you mentioned the Opera Comique in which there are four doors and exits; I have been there two or three times; I had no idea that there were exits behind. I only knew of the one going under the street; would it not be a very advisable thing that some authority should insist that it should be written up in large letters in two or three conspicuous parts of the theatre where those exits are?—That would be very advisable in every theatre I think; it would be a most advisable thing in the interests of the managers themselves to point out that their theatre is not so dangerous as the public consider it. Anything which could lessen the chance of panic would be to the advantage of the managers as well as the public.

1216. All the doors are made so that if there were any pressure they would open the right way?—All the doors within the building either open outwards or swing both ways.

1217. With reference to the doors coming ont of the boxes, do they open outwardly?—I will not say they all do. In some cases where the passages are narrow they open on rollers.

1218. So that they would not get in the way?—They would not get in the way.

1219. In almost all the places where those doors are not made, as you describe, the doors of the boxes will open so that they will almost block the passages?—Yes, in one or two instances they do, but we look to that at the annual inspection very closely, and whenever possible that is amended and altered; they must open outwards if possible.

1220. You order them to be made to open flush against the wall?—Yes.

1221. Do you know that the Lord Chamberlain was offered a chair in the gangway at the Criterion the other night?—I did not hear of that.

1222. Mr. *Hardy.*] With regard to these exits which you say it would be desirable should be publicly notified, would it not also be desirable that some one of the officials of the theatre should be put in charge of them, so that if a fire broke out they could be thrown open at once?—That is the custom.

1223. Mr. *Clifton.*] Could you tell me whether a fire generally takes place in the body of a theatre, or the stage?—The stage is the most dangerous part, and the workshops.

1224. I think

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1224. I think you stated there was always a separate exit from the stage?—Yes.

1225. I think in the case of the Folly Theatre the exit from the stage is between the exit from the gallery and the pit?—The Folly Theatre is the one which I alluded to just now as being inclosed within walls. The pit and gallery exits join together and come out at one large exit. The stalls and boxes exits also join in a large exit; and the stage exit is between the two.

1226. Is not the exit from the Folly Theatre from the pit and the stalls together somewhat cramped?—No, I think it is pretty good.

1227. You could not offhand, I suppose, tell me the exact width?—I could not. It has been improved of late.

1228. The exit from the stage comes up between the two?—Yes, between the box and pit exits.

1229. In case of the front part of the building catching fire the actors would have rather a bad time of it in getting out, would they not?—No, the exit is all under a fire-proof floor.

1230. Is the roof fire-proof?—The roof of the passages is fire-proof.

1231. When the annual inspection is made do you insist upon hydrants and different appliances being used for the extinction of fire?—Yes.

1232. Has every theatre got hydrants?—They have all got fire appliances of some kind or other. Some are served from cisterns on the roof, and some, whenever it is possible, from high-pressure service.

1233. You do not insist upon all having hydrants from the mains with a high-pressure service?—In some places it is not possible, because the high-pressure main is not carried down the street.

1234. In places where it is possible do you insist upon it?—We recommend it very strongly.

1235. But you have no power to insist upon it?—No, if they have an efficient service from cisterns that is almost sufficient for the purpose, which the Lord Chamberlain looks to, viz., the time that the public are in the building, and that there is enough to cope with the fire at the moment of the outbreak.

1236. You agree that theatres ought to be divided into separate compartments; you do not like the iron curtain; do you propose to divide the stage from the audience?—That could only be done by building the theatres of fire-proof material; it would be of very great use if an iron curtain could be adopted, but I have heard of nothing up to this time which could be used.

1237. In the case of new theatres being built you would, I suppose, hardly license them if they were connected with other buildings?—I think that is a strong expression; in London it would be impossible to find the necessary space. The Committee of 1866 was very much in favour of extension of theatres, and since that time the Lord Chamberlain has granted licenses more freely than he had done before. If there are party-walls carried up to the roof, that would be sufficient, I think. In the case of any new theatre being built now we should wait for an expression of opinion by this Committee, and any suggestions which were made we should consider most carefully.

1238. But you think it would add to the safety of a theatre if it was isolated entirely from other buildings?—Yes, certainly, as far as other buildings are concerned.

1239. Do you consider a large theatre more dangerous than a small one?—Not if the exits are carefully looked after; but wherever a large number of persons are congregated together there must be danger from panic.

1240. In places like Covent Garden, do you not think it would be advisable to have a central gangway from the stage right through to the pit and stalls, as they have in the Alhambra, for instance?—I do not think it would make any material difference; each row of stalls is, in itself, a gangway.

1241. You do not think that in the case of panic it would be useful?—If you make it too easy a large number of people would come together to the exit. I think that a gradual feeding of the exit is safer than having too large a number of persons arriving at it at once.

1242. Are you aware that where the doors open outwards in some theatres they put bars on the outside of the doors to prevent a crush when people are going in and coming out?—When people are coming in it is necessary to have

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barriers to prevent a crush, but those are always removed when the first crush is over, and they are made to swing outward.

1243. I went over a theatre the other day when the performance was going on, and the bars were still on the doors?—I do not know where that could have been. The barriers, which are placed to prevent a crush going into the theatre, are made to swing outwards, so that though they would prevent the audience going in, yet if the audience were coming out they would give way with them.

1244. Sir *Henry Peek.*] I understood you to say that all theatres must be licensed by the Lord Chamberlain?—All theatres within the metropolitan boroughs, as defined by the old Reform Bill.

1245. The music halls need not be licensed?—They are not licensed by the Lord Chamberlain, but by the justices.

1246. Both buildings are licensed, but by different authorities?—Yes.

1247. Is there any broad line of demarcation between theatres and music halls?—Music halls cannot perform stage plays.

1248. I thought you stated to some honourable Member of the Committee that they did perform pieces at music halls?—No; the Committee of 1866 was an inquiry into that very question, whether there might not be an extension of their performance. Music halls are licensed for music and dancing by the justices for the various counties in which the metropolitan district is situated, and not for theatrical purposes.

1249. If I understand you, you have really no power of punishment whatever, no matter how much they may disregard your recommendations, or offend you in other respects in taking away the license?—That is the only penalty.

1250. And that you think so severe that you have really no power at all?—There have been very rarely cases in which it would have been necessary at all. The managers have always been most anxious to carry out any recommendation, almost without exception.

1251. The work you already do is quite enough for the staff of the Lord Chamberlain's office?—The Lord Chamberlain has no staff of inspectors. I, as the permanent Secretary of the Department, look to it entirely, assisted by the Examiner of Plays, who is an officer of the department. We also employ from time to time the best surveyor we can find to accompany us in those inspections, but we cannot be always inspecting. The inspection takes place once a year, or at the request of any manager, if he is going to make an alteration.

1252. Supposing one of the public were to make a complaint that in his opinion there was a very great want of something in a theatre, would you then go and inspect it?—At once. Any suggestion that is made is immediately inquired into.

1253. If I understand you rightly, if any more work were thrown on your office, it would be only fair to make it a public office?—Certainly; the Lord Chamberlain's office is paid now from the Civil List, and it would be only fair that if much more work were required it should be done by a public office, and paid at the expense of the country.

1254. You stated that some of the theatres were not provided with hydrants because the mains were not near enough; could you tell the Committee which they are?—I could not tell you all of them.

1255. Could you tell us some?—I think the Prince of Wales's Theatre is one; but I could not tell you from recollection.

1256. There are several, are there not?—Yes.

1257. I think you stated that for 50 years there had been no life lost in a theatre in this country?—I saw a letter in the newspaper the other day to that effect from Mr. Hollingshead, whom you will perhaps examine. I am not aware of a life lost among the audience from fire. There have been people burnt in theatres in other countries, but not one of the audience has been burnt in any theatre in this country for the last 50 years.

1258. Lord *Lindsay.*] You say that all these theatres are safe under ordinary circumstances; by "under ordinary circumstances" do you mean in the ordinary case of absence of panic?—No; I mean that if the audience were to go out in the ordinary way there is no theatre in London which cannot be cleared

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cleared in five or six minutes. For instance, the Criterion was timed last night when it was very full, and the auditorium was clear under four minutes.

1259. In the case of a panic, how much longer would it take to clear the theatre?—That depends upon the public themselves.

1260. Because in many of these theatres which I have seen the door is at the narrow end of a funnel, so that you get a great number of people at the commencement of a passage which leads up to a door, which may be a swing door, and then there is a very narrow embouchure?—We have always considered that the narrowest part of the passage is the widest: that is to say, we have always calculated the narrowest part as the measure of the width of the passage.

1261. What I have noticed in one or two places is that the wide part is on the wrong side?—Then in measuring that passage we have always calculated the narrowest point as the measure of the width.

1262. I mean to say that the greatest crush comes from the broadest entrance towards the narrowest?—There may be instances of that, but that is not the principle which we wish to see carried out.

1263. You say that there are no theatres in London without at least three entrances, but that many of the others have extra exits in case of fire?—That is so.

1264. Is it usually known to the audience that there are other means of getting out than the usual entrances?—Naturally the audience use the entrance they are accustomed to, and would probably make a rush to that point, but Mr. Herbert's suggestion that the extra doors should be indicated would no doubt be a very valuable one; in fact, it has been impressed upon managers very much during the last year, but there is a natural disinclination to change anything which has existed before.

1265. Do you think that if these extra doors should be used once a month that would do any good?—They should be available every night.

1266. I do not mean available, but actually used and thrown open to the public?—It would be very useful to accustom the public to use them; of course there are difficulties involved; if they are always open you must have persons to attend to them, which involves expense, and that is the real reason why it is not done.

1267. If this were done those exits would come to be known?—Yes.

1268. With regard to the Royalty Theatre in Dean-street, Soho-square; that has a house in front of it, has it not?—Yes; it was originally the residence of Miss Kelly the actress, and she built a small theatre over her garden for her pupils to practice in; it has been improved at various times and is now a regular theatre.

1269. Is there convenient means of exit from that theatre except through the house upstairs and downstairs?—Only from the house, but directly you are out of the theatre you are in another building.

1270. Directly you are out of the theatre you are in the house, and in a worse state of crowding; that is a very disagreeable passage to go down in a rush; supposing the house were to catch fire how would it be for the people in the theatre?—They could get out at the back; they could get over the stage, but the house is not the place where a fire is expected, of course. It is one of the old places.

1271. In that theatre you will find if you are coming up from the stalls, that a person getting out of a box will stop the exit from the stalls; it happened to me last year when somebody was in a box and I was in the stalls, and we could not get past at all because somebody blocked the passage up altogether by opening his box-door?—I will make a note of that.

1272. Now with regard to placing a gangway down the middle of a theatre; in almost every other country theatres have a centre gangway coming down from the back of the theatre to the stage, as well as the entrance at the sides. Do not you think that that would make an enormous difference in clearing a house, and saving the great crush which there is always in the stalls in the case of a panic?—I do not see that the centre gangway would assist in that case unless there were an exit at the back, which would be a case of reconstruction. In the French theatres there is a railing down the centre of the stalls so as to prevent the audience from passing from one side to the other.

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1273. You say there has been no life lost among an audience in a theatre in London within the last 50 years by fire?—That is so.

1274. Have there been any lives lost by pressure?—Yes; by pressure and by panic many lives have been lost.

1275. Mr. *Onslow.*] When anyone wants to build a theatre, has he first to get a license to build it?—The rule we have gone on is this, that the intending builder sends in a statement of where the proposed site is, and the Lord Chamberlain takes the opinion of the police as to whether there are any public objections to the site on the score of interruption of traffic, or any other circumstances of that kind. If the site is approved of, the plans are submitted to the Lord Chamberlain, who has them looked over by a professional surveyor, and when those plans are approved of the theatre is built.

1276. Supposing on looking at those plans the Lord Chamberlain was to say you have not sufficient means here of preserving this theatre from fire; your mode of exit is bad. Could he, upon that score, put his veto upon the building of that theatre?—Certainly; a person might build on speculation of course, but he would not obtain a license unless the Lord Chamberlain was satisfied that the means of ingress and egress were sufficient.

1277. Then take this case: supposing the Lord Chamberlain were to say, I will not sanction that building, it does not meet the requirements which I think ought to be met; could the man say, then I will turn it into a music hall?—Certainly; but he would have to get a license for that.

1278. How many theatres are there in the metropolis under the Lord Chamberlain's office?—There are 40.

1279. *Chairman.*] Have you any record of the number that there were in 1866?—There were 26 then.

1280. The number has increased therefore from 26 to 40?—Yes; this is a list of the theatres in the metropolis (*handing in the same*).

1281. Mr. *Onslow.*] The Lord Chamberlain would not think himself justified in refusing a license on account of the number of theatres?—No.

1282. I believe the Court Theatre is not under your jurisdiction?—No; that theatre is in the new metropolitan borough of Chelsea, which was not a Metropolitan Borough at the time of the passing of the old Reform Act.

1283. Is that the only theatre in London which is not under the jurisdiction of the Lord Chamberlain?—There are theatres at Greenwich and Woolwich, and all round London.

1284. You do not know exactly how many?—I could not tell how many; there is one at Kensington, if that is London; and at Bayswater.

1285. After a theatre is built, before the Lord Chamberlain grants the license, some authority is sent from his office to thoroughly inspect it, is there not?—Yes.

1286. Then supposing he has sanctioned the plans, but thinks that something should be done, and he throws out suggestions for the further protection of that theatre from fire, and supposing the manager says it will cost too much, and will be too expensive, can the Lord Chamberlain then withhold his license?—If he had originally passed the plan it would be hardly fair to add any very large expense afterwards, but he could certainly do so.

1287. Supposing such a thing as this were to happen: that supposing the Lord Chamberlain were to recommend, after the building of a theatre, that for better protection a solid wall should be built between the auditorium and the stage, could he insist upon that wall being built?—Certainly he might refuse his license if it was not done; the license is renewed every year, and any requirements which he might consider necessary might be insisted on.

1288. An honourable Member suggests to me that there might be a vested interest in the license the same as in a public-house?—Precisely.

1289. Sir *Henry Peek.*] The Lord Chamberlain could not take away the license then if there were any vested interest in it?—I presume that would be so.

1290. Mr. *Onslow.*] Can you give the Committee any estimate of what addition

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tion you would require in your staff if all the places of amusement in the metropolitan area were put under the Lord Chamberlain's office?—I could not; it would be a very large affair. As I mentioned to the Committee after the Report of the Committee of 1866, a Bill was drafted carrying out the recommendations of the Committee, that all places of public amusement within the metropolitan area should be put under the Lord Chamberlain. I went into the matter very closely at that time, and found that there were between 500 and 600 places of the kind, and no doubt the number has been very much increased since then, and to look after 500 or 600 places would require, of course, a very large staff.

1291. With regard to this "stone felt," which we have had brought under our notice by Mr. Penrose, it used to be called "Brannon's Patent"; you do not know it under that name?—No, I do not.

1292. Is there in every theatre in London a responsible head of the employés?—The manager is the person who is responsible to the Lord Chamberlain and to the public for everything which takes place in his theatre.

1293. Are you aware that there is a responsible head under the manager to supervise all the employés?—There are heads of departments in a theatre just as they are in any other establishment.

1294. I put the question because it was supposed, according to the evidence before us, to be one of the reasons why the fire took place at Brooklyn, that there was no responsible head over the employés in the theatre?—I am not aware how that was.

1295. If the manager is absent, as I suppose he very often is in a theatre, is there any other responsible person in his place?—In every theatre there are the heads of each separate department; for instance, the treasury, the stage, and the front of the house; there is some person responsible to the manager in each of those places.

1296. *Chairman.*] But the whole responsibility rests always with the manager, and his is the name attached to the license?—Yes.

1297. Mr. *Clifton.*] In his own interest he would always leave somebody in charge?—He would always leave somebody in charge.

1298. Mr. *Onslow.*] Is there any organisation, in the case of fire breaking out in a theatre, for the putting out of a fire?—That entirely rests with the manager.

1299. The Lord Chamberlain does not require that on granting a license?—No; there are certain requirements laid down. I beg to hand in a copy of the regulations which are issued to managers. (*The same was handed in.*)

1300. In the Lord Chamberlain's opinion, he considers that if these regulations are acted up to they would be sufficient to protect theatres from fire?—Yes, that is so.

1301. With regard to the conclusion of the committee on the Brooklyn fire, I should like to read them seriatim, to see what is your opinion. "First. In the erection hereafter of any building intended for theatrical purposes, there should be a brick wall, extending from cellar to roof, dividing the stage from the auditorium"; that means erected hereafter; of course, it would be impossible to do it in some of our old theatres; would you agree with that suggestion?—Certainly; it would be most important.

1302. Secondly. "There should be two fire hydrants on the stage, one on each side, at some convenient place; there should be one in the fly gallery; there should be one in the front lobby; to each of which hydrants there should be attached a proper length of hose, frequent examination of which should be made, so as to insure its being at all times ready for effective service"?—Of course, the number of hydrants would depend upon the size of the theatre, but, generally speaking, I agree entirely with that recommendation.

1303. For an ordinary London theatre I suppose two would be sufficient, one at the back and one on the stage?—Yes.

1304. The theatres in America, I suppose, are larger than ours, are they not?—No, I think they are about the same; they vary.

1305. Thirdly. "There should be employés of theatres, whose sole duty should be to attend to these hose at all times when there was an audience in

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the building." I suppose that means that there should be some organisation?—That is left entirely to the manager. In some cases they have firemen; in some the master carpenter is responsible for all matters connected with the stage in that way. In all theatres there is some one whose business it is to look after the hydrants.

1306. Take the case of a ship; in the case of a ship everybody is drilled to be prepared for fire?—Quite so.

1307. Fourthly. "As a third gallery is attended with more than ordinary danger, not less than two wide and commodious stairways should be provided as a means of exit from it"?—Yes, I think that is a very good suggestion.

1308. Fifthly. "As scientific discovery and experiment have demonstrated the possibility of rendering incombustible the material used for scenery, the use of any inflammable article for that purpose should be prohibited"?—I believe that to be impossible.

1309. Then there is this difficulty also, that if you paint on the top of that the paint would be a conductor of fire"?—The paint used for scenes is in itself incombustible; it is water colour. You can scarcely set a piece of canvas on fire which has been painted on both sides with water colour.

1310. Sixthly. "There should be hand-rails on each side of every stairway"?—I am not very strong upon that point as to their utility, and there are objections to them; accidents have happened through hands and arms being caught in those hand-rails; still we do advise them in most instances, but in some places it would be undesirable. I do not think you can make any general rule in matters of that sort.

1311. Seventhly. "There should be iron fenders at intervals of not more than 12 feet upon all the border lights, so that no portion of the scenery, whether through carelessness or accident, could come in contact with the wire which encloses the gaslights"?—You will find amongst our regulations something of the same kind.

1312. This is a suggestion which the aldermen of Brooklyn make: "That all doors leading from the auditorium to the stage in theatres or halls should be of fire-proof material;" could that be done?—That depends upon what is a fire-proof material. Wood is as good as anything else. Nothing is stronger than wood.

1313. *Chairman.*] Do you mean as regards resisting fire?—As resisting fire for a time.

1314. That is in accordance with Captain Shaw's statement, that a combination of stone and iron is about the most useless in case of fire?—Yes, unless supported.

1315. Mr. *Onslow.*] Would you recommend that a fire alarm bell should be put up in every theatre, so as to communicate at once with the nearest fire-engine?—That would be a very good plan.

1316. That is not the case now?—No, the audience must be out before the arrival of a fire-engine, or else they would have a very poor chance; that is to say, no fire-engine could arrive under five or six minutes, and the audience would be out of the theatre before that time, or at least they ought to be.

1317. Mr. *Locke.*] They would without panic?—Yes.

1318. Mr. *Ritchie.*] How long have those regulations which you have handed in been in force?—They were only printed last year, but they have been in force from time immemorial.

1319. Of course it is the duty of whoever goes round for the annual inspection to see that those regulations are all carried out?—Yes.

1320. One of your regulations is that all doors and barriers are to open outwards; would you be surprised to learn that in one of the principal theatres in London one of the halves of one of the doors in one of the principal passages has, in consequence of an accident, been immoveable for two years?—I should be very much surprised to hear that.

1321. Should you think that it could be so, with the inspection which has taken place?—It is possible that it may have been overlooked, but it is unlikely.

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1322. It would be rather a serious state of things if that were the case?—That depends. If one-half of it will open ——

1323. But this is a swinging door, and only half of it is able to be used?—I can only say that I cannot give an opinion without knowing the facts.

1324. I think you could give an opinion; if there is a door in a passage, and that door is supposed to open outwards, surely it means that the whole available door should open outwards, and therefore, if one-half of it were immoveable, or incapable of being opened, surely that would not be in accordance with this regulation?—Certainly not.

1325. Then, with regard to doors opening outwards, has that regulation been in existence from time immemorial?—Yes; for the last 20 years.

1326. Is it not the fact that it is only now that some of the theatres are making that alteration?—Every now and then new doors are put in.

1327. But I am speaking about old doors?—No; it is constantly impressed upon the managers that all doors must open outwards.

1328. I do not wish to give you the name of a theatre, but I have been to a theatre recently where they were just altering a door?—The outside doors of a theatre cannot open outwards because they open into the streets, and abut upon the streets, but they lock into the wall backward, where they cannot get in the way.

1329. I am speaking about inside doors; I was in a theatre where those alterations were, I do not think, quite completed, but there were still one or two doors to finish; therefore it shows that the regulation has not been very strictly adhered to in all cases?—It is very strictly adhered to, but there may have been one or two cases overlooked; we cannot always hit every blot.

1330. If the regulations were made you would advocate that they should be adhered to, and that steps should be taken to ascertain whether they were complied with at every inspection?—It could not have been a door that was used generally.

1331. This fixed door I also saw myself in one of the principal passages?—I should be very grateful to you for any information upon the subject; we are always most anxious for information.

1332. I think you stated that it would be impossible to make the outside door open outwards. Now I think it most desirable that all outside doors should open outwards, and I do not see the impossibility of it?—You would have to alter the Act of Parliament, because the Metropolitan Building Act, I believe, forbids that in some instances.

1333. If you were to place the outside doors of your theatres sufficiently far inside the passage to enable them to open outwards within their own ground, it could be done then?—Yes.

1334. Do not you think it is very advisable that that should be done?—It is just the same thing if the doors are locked back; it makes no difference.

1335. But a rush may occur, and you know that when a panic takes place the right man is very often not found?—But the doors are kept open.

1336. *Chairman.*] During the performance in a theatre these doors are kept permanently locked back?—Yes.

1337. Mr. *Ritchie.*] I am rather surprised to hear you say that; it may be true of the principal entrance, but I can say from my own experience that it is not so of some of the entrances which are made available?—Perhaps it is not.

1338. If the outside door as well could be made to open outwards it would be an advantage?—I think that the locking back is just as good.

1339. If they are kept locked back; but if they are shut it is not so good?—You are there alluding to what are called extra doors, I presume.

1340. No, I am alluding to doors other than the actual box-doors, but doors leading from the gallery I rather fancy. In one theatre I recollect distinctly seeing a door which was hooked with an iron hook from the outside of the building, and which it was utterly impossible to open at all until some one went outside and opened it from the outside?—Any experience which you have we shall only be most grateful for.

1341. Do you know what was the origin of the fire in the Brooklyn theatre?—I read the report at the time.

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1342. It was a drop-scene coming in contact with the gaslight?—That is what was said.

1343. You state that, upon your annual inspection, you go round in the daytime when no performance is going on?—Yes.

1344. You also stated that a panic was a rare thing?—Yes.

1345. You have to guard against the smallest fire in a theatre in case it should create a panic?—Quite so.

1346. Those small fires sometimes do occur upon the stage, and they are not considered of much moment?—That is so.

1347. Are those fires reported to the Lord Chamberlain's office?—Yes.

1348. Is it one of the regulations that they should be reported?—No.

1349. Would you not advocate that they should be reported, however small?—Yes.

1350. And the cause of them?—And the cause of them.

1351. Of course going round in the daytime, it was impossible for you to see the action of the gas upon the stage?—It was.

1352. Seeing that it is from the scenery coming in contact with the gas that the greatest danger is to be feared, do not you think that it would perhaps be advisable to make the inspection at a time when the operation of those gas-burners could be seen?—There are general regulations as to that, and the managers are responsible for the carrying out of those regulations.

1353. Of course we want to guard against the possibility as much as possible of any fire taking place; I know in some cases that there are naked lights between the scenes without any covering at all?—Moveable lights are carried about.

1354. Are you an advocate for leaving those moveable lights uncovered, as they are at present?—You must alter the whole system of theatrical representation if you do not.

1355. The lights are covered in some theatres, and uncovered in others; I refer to the lights which hook on?—They are all uncovered.

1356. I must say that I did not see any which were not uncovered, but I was told that there were some which were covered?—They usually have a band round them to guard them, but it would not be possible in all cases, unless you alter the whole system of theatrical representation.

1357. One thing you require is to have hatchets for cutting down scenery and other things; do you make a point of seeing whether they have those hatchets at hand?—That is merely a recommendation.

1358. Regulation No. 10 is: "Hatchets and hooks to be in readiness to cut down hanging scenery in case of fire"?—That is a recommendation and not a regulation.

1359. My experience is that if you inquire you will not always find the hatchets?—Possibly not.

1360. Buckets are insisted upon, are they not?—Yes.

1361. Are you aware with regard to chairs in gangways, whether at any theatre in London it is the practice, and not the exception, to make up in the dress circle one outer row of chairs in the gangway every night?—I think I know what you are alluding to.

1362. That would be a very bad arrangement if it were done; that is to say, if there were a gangway right round the dress circle to enable people to get out of the theatre, it must certainly be an obstruction to place chairs in that gangway, and to make a constant practice of that would be very reprehensible, I imagine?—It depends upon the circumstances of the case.

1363. Have you formed an opinion of what should be the minimum width of the gangway round the dress circle?—That must depend upon the audience and the size of the theatre.

1364. But it should be sufficient to enable people to pass round between the chairs and the wall?—I am not an advocate for passages within a building being too large, because you may feed the exits too rapidly. I think it is much better that in such cases as in the stalls they should feed gradually into the exits.

1365. But I would ask you, is it not a great element of danger that there should be moveable chairs in the way of people getting about?—Yes.

1366. It

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1366. It is an element of danger?—It is; everything of that sort ought to be fixed.

1367. With regard to the high space all round a theatre, are you aware how the Brooklyn Theatre was situated with regard to that?—I think it was stated that it was very well situated in that respect.

1368. And that did not prevent a great loss of life?—No, it did not.

1369. I suppose the danger of having a theatre placed in the midst of, or attached to, other buildings, is rather to the other buildings than the theatre?—It acts both ways.

1370. I mean that a fire is much more likely to occur in a theatre, and to cause danger to the other houses, than for the other houses to catch fire and cause danger to the theatre?—No doubt that might be so.

1371. You have a regulation that notices are to be placed up with regard to certain staircases and doors being used in cases of emergency; are you aware that those notices are put up?—It must be at the responsibility of the manager if he neglects this regulation, and if an accident occurred it would be very serious for him.

1372. I ask whether it is the duty of some one to see that they are strictly adhered to?—I have already explained that the Lord Chamberlain has no staff of inspectors of any kind.

1373. So that we may take it that you have not sufficient staff to see that the regulations which you make are attended to?—Every year, at the annual inspection, these things are looked to very closely, and the attention of the manager called to any requirements. Any complaint upon the part of the public is at once attended to. For instance, if you have any cause of complaint and write to us, we should at once attend to it, and the manager's attention would be called to it immediately.

1374. I think I understand you to say that you would be an advocate for doing away with this practice of keeping the extra doors closed, and allowing every door to be used every night?—I think so.

1375. I think it most advisable myself that all means of exit should be used nightly?—Each theatre differs so much from others that it would be almost impossible to give a general opinion upon that.

1376. Take the Opera Comique; is it not the case that all the occupants of the dress-circle and the whole of the stalls have to find their way right round the semicircle to one point to get out?—Yes, but there is a door on the other side which can be used in case of need.

1377. Do not you think that, taking that one particular theatre and that one particular instance, it is a very bad arrangement that everybody should have to find their way round the semicircle to that point?—That arises from a police regulation; people from the dress-circle go to where they find their carriages, and the police stack the carriages on one side.

1378. But speaking about this one particular instance, your placard is up there; there is a staircase, and do you not think it advisable that that staircase should be always open?—I can see no reason at all against it; I hope it is always open.

1379. In some theatres a lot of properties are stowed away under the stage, are they not?—Yes, of course, wherever their store-rooms are. They are bound to have their properties ready for the purposes of the stage.

1380. But it is not so in all theatres, is it?—Yes; in some theatres of course they have store-rooms elsewhere, because things accumulate at an enormous rate.

1381. Are you referring to scenic property and actual furniture?—Yes.

1382. My experience is that those places are entirely free in some theatres, and very much used in others?—It all depends upon the class of entertainment that is being given.

1383. Do not you think it would be advisable to have some regulation that those things should not be stowed away underneath the stage?—Then you would be obliged to have a regulation that they must have extra houses and so forth, and you would then be interfering with the management. I am all for holding the manager responsible for these things.

1384. In what way is the manager responsible now; if a fire takes place and

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people are burnt, the manager is not responsible either in purse or in person, is he?—I should hold he was.

1385. I was not aware that there was any obligation upon him. I thought that your giving him a license took away any responsibility from him of any kind?—We have always held him responsible entirely, and according to the Act of Parliament it is so. I refer to the 7th section of the 6th & 7th Victoria, where you will find that it is so laid down.

1386. I notice that underneath the stage all the supports are invariably made of wood; do not you think that it would be very desirable to have the supports at least of iron or brick?—No; wood is much safer than anything else; you cannot burn a tree except with great difficulty, and it would take a very long time. I think it is better than anything else. I remember when the old Surrey Theatre was burnt down, it had originally been built of wood; but the galleries had been extended and made larger with iron supports. I went to look at it the day after, and there were the wooden supports standing supporting the old gallery, and the new gallery was all to pieces with the iron supports twisted up like thread papers.

1387. One honourable Member suggested in his question that there was much more danger in emptying a theatre upstairs than in emptying one downstairs; do not you think that there is more safety in going upstairs in a crowd than in going down?—I think there is.

1388. At all events there is no greater amount of danger in going upstairs than in going down?—No, I think the contrary is the case.

1389. I think you stated, with regard to chairs, that it ought to be in the power of anyone to make it a police offence?—To put it in the power of the public to help themselves; in this sort of small matter nobody can control what takes place every night.

1390. Do not you think that it should be the Lord Chamberlain who should prosecute in a case of that kind, if the offence were reported to him?—No, I think not; he is not a public prosecutor.

1391. Would you leave it in the hands of the public?—I would leave it in the hands of the public.

1392. You spoke about its being the people's fault who went to theatres, more than the manager's?—I think it is.

1393. Is it not the fact that they know pretty well before you go in downstairs whether the theatre is full or not?—Yes.

1394. Therefore the managers are not bound to admit anybody who wants a seat, if there is no seat to give him?—No.

1395. I will just ask you this one question in conclusion: you think it very desirable that all cases of fire, however slight, should be immediately reported to the Lord Chamberlain?—Certainly.

1396. That, I suppose, you could do by regulation?—That shall be added to the regulations.

1397. *Chairman.*] I wish to ask you one or two questions in conclusion: you are aware that, in the evidence given before the Committee in 1866, your statement with regard to the number of theatres which have been burnt down without loss of life was confirmed by a table put in by Captain Shaw showing that between 1833 and 1866 there were 50 theatres in which fires occurred without loss of life; that is stated at page 327?—I remember that perfectly.

1398. That all bears out what you stated as a general report?—It does.

1399. With regard to those regulations, they take the character more of suggestions than of actual regulations, from the fact that although the Lord Chamberlain has the power of withdrawing a license, he has no power less than that, of enforcing them?—Yes.

1400. And what you would suggest, in any change which might be made, would be that there should be some power, either in the Lord Chamberlain or in some other public officer to be appointed, of enforcing penalties for infractions of regulations less stringent than the taking away of a man's license?—Some simple means of enforcing the regulations.

1401. In that way the regulations laid down would become operative, and would be enforceable?—Quite so; many of these which are called regulations, are

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are more of the nature of suggestions to the managers, who are held responsible for everything which takes place in their theatres, and if they think it better that there should not be such and such things done, they must be responsible if an accident occurs.

1402. But the Lord Chamberlain, having the power of the removal of the license, has, practically, no power at all, because it is not one which he is likely to enforce; whereas he would enforce his regulations if there were a power of inflicting small penalties?—Yes.

1403. With regard to the annual inspection which you make of those theatres before the licensing day, do you let the managers know when you are coming, or do you take them by surprise?—We have usually given them notice. They know as well as possible that when the months of August and September come we shall visit the theatre with a view to their application for a renewal of the license for the ensuing year.

1404. You give them notice of the day you intend to visit the theatre?—We do.

1405. I am desired to ask you whether you go yourself upon these inspections in the months of August and September?—Yes, I do, and on all other occasions.

Mr. *Jethro Thomas Robinson*, called in; and Examined.

Mr. *J. T. Robinson.*

1406. *Chairman.*] I BELIEVE you are an Architect with a good deal of experience in the construction of theatres?—I am.

1407. Have your services been used by the Lord Chamberlain's office for the purpose of inspection?—Yes, for about five years.

1408. Have you personally accompanied the last witness in inspecting theatres?—Always.

1409. Will you state to the Committee what regulations you think necessary, with regard to construction, when a manager of a theatre applies to the Lord Chamberlain's office for a license?—I generally take the rules which are laid down by the Lord Chamberlain, and then if I think any additional rules are required I suggest them; such as two staircases for each part of the house; two exits for each part of the auditory.

1410. Are those conditions followed out in the case of all managers of new theatres applying for a license?—In the case of all that have been under my inspection.

1411. In inspecting the older theatres which apply for the renewal of their licenses, are those conditions either suggested or enforced upon them?—No; where practicable, we suggest improvements yearly.

1412. And those improvement you find the managers willing to carry out?—Of late they have been very successfully carried out.

1413. With regard to the modes of egress, do you agree with the last witness that all theatres are capable of being emptied within from five to seven minutes, provided there is no panic?—Yes.

1414. Of what width, as a rule, are the passages which form the exits from the theatre?—They vary according to the size of the theatre,

1415. Have you any fixed plan of your own which would regulate the width of the passages according to the audience?—I have one which I would suggest.

1416. What is that width?—I would suggest nothing less than four feet wide.

1417. Do you mean by that a four-feet passage directly to the exit?—Yes.

1418. Should that be four feet in all its width?—In all the length of the passage.

1419. I suppose there would be a disadvantage in the passage being wider in parts, and then coming down to four feet again?—I think so.

1420. That, if anything, the widening should never be allowed except close to the outer end?—Except close to the outer end.

1421. I suppose what influenced the last witness would influence you in recommending that no passages should ever be of such a width as to give too great facilities for people pouring out?—We have frequently discussed that together,

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together, and I have waived sometimes my opinion in his favour, where cases have shown that it was better not to have too wide a passage.

1422. So as to allow the people to go out more slowly and not to get crowded, as they would if they went out more quickly at the narrow part of the door?—So that they do not block up the outer door too quickly.

1423. Of course the doors should all, as your regulations suggest, open and swing both ways, but certainly outwards?—I think it says swing both ways, or open outwards: that they should open outwards is all that we request. I have never asked for anything else on behalf of my inspections. I say if they open outwards it is sufficient for the protection of the public; all barriers and doors are to be made to open outwards.

1424. In the passages of four feet, would you allow barriers to be erected?—If they opened outwards, I would.

1425. Provided the barriers were of the same width as the passage?—They might be something less than the passage.

1426. Wherever they were less than the passage, would you not create a corner, as it were, in your passage from which danger would arise in the event of any great pressure?—No, because it would open and give way and go flat against the wall.

1427. So as to avoid making any corner where people could be crushed by the pressure. What I meant was that supposing the passage was of that width all the way, and the door is less by so much, you get two angles in which, if there is a great pressure, a person might be crushed?—We have generally got four or five inches only by those angles, but we are very careful to see to that during our inspection.

1428. The space occupied would be limited to three or four inches?—About that.

1429. Mr. Ponsonby Fane stated that in some theatres there were doors that were not generally known to the public, which were available in the case of danger, to let the audience out almost immediately from the theatre into the street?—Yes, in many theatres there are.

1430. Would you endorse what he stated in recommending that the knowledge of those doors should be made general by the managers?—Yes, I believe that the whole of the managers had notice to that effect this year.

1431. Have you heard of any fresh regulations in consequence of that notice, with regard to those doors becoming more generally known, being made by managers of theatres?—I think all the managers have now put notices upon those doors.

1432. That may be true, but notice upon the doors if the audience went out by other doors, which they would do for the purpose of getting to their carriages, would not make them known to the public practically. Do you think they should be made known to the public by throwing them open on ordinary occasions and not merely on occasions of danger?—I think it would be better to have an attendant there, and to have the doors open every night during the performances.

1433. Do you think that a regulation ought to exist that those doors should be used generally, and not merely reserved for cases of emergency?—I would suggest that they should be open during all the performances.

1434. That there should be exits which the public could use on all occasions?—Yes, on all occasions.

1435. Therefore the public would practically become generally acquainted with the fact that there were one or two doors more than they at present use?—I would recommend that they should be used nightly, so that the public might become used to them.

1436. In fact they would become generally in times of emergency a means of exit from the house?—Yes.

1437. The only objection the managers have to that, would be the expense of a doorkeeper at each one of those doors?—Quite so.

1438. That should not stand in the way of any increase to the public safety?—I think not.

1439. At present the law does not allow the enforcing any of those regulations except by the harsh rule of taking away the license?—Quite so; those are suggestions to the managers.

1440. And therefore, if those are suggestions which are to be made effective, it

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it would be necessary to have some power of enforcing the regulations by fine or otherwise in case they were not carried out?—I think we should get them done better and quicker in that way.

1441. I suppose you are aware of the other regulations laid down by the Lord Chamberlain?—Yes.

1442. With regard to the water supply to theatres, has any improvement taken place in the storage of water, or the appliances for the use of water in theatres?—The last three or four inspections we have been able to get the managers of Drury Lane and Covent Garden, and a few more theatres, to put their theatres upon the high-pressure main.

1443. They have got hydrants at high pressure at those theatres?—Yes, at many theatres.

1444. With appliances, hose, and otherwise always in readiness?—Yes.

1445. Has that recently been done?—Within the last three years.

1446. You make that regulation general now, carrying out what I see is one of the old regulations of the Lord Chamberlain?—In all theatres where a high-pressure main is laid near; in some cases there is no high-pressure main in the street.

1447. But wherever there is a high-pressure main near and available, in most cases you have recommended, and in many cases they have adopted, the application of hydrants to the water supply?—Yes.

1448. Is that upon the stage?—Yes, upon the stage and in the flies, and in a portion of the auditorium; in the dress circle, or wherever we think it most useful.

1449. I suppose wherever high pressure is adopted in the metropolis you would consider it desirable that that should be made one of the recommendations of the Lord Chamberlain, if the Lord Chamberlain had the power to enforce them?—I should recommend it.

1450. An honourable Member called attention to the hatchets and other appliances for cutting down scenery in case of fire; that is not, I suppose, very often attended to at present?—I generally look for them on the flies, and I generally see them.

1451. You not only look for them but you see them?—I see one or more.

1452. You think the recommendation is complied with to a certain extent, which might be successfully used in case of fire?—Yes, it would be very useful in case of fire in the flies.

1453. Is that regulation that these notices, orders, or suggestions of the Lord Chamberlain should be posted up in the theatre where they can be seen carried out?—Not these regulations. As far as the wet blankets and buckets of water go, those things are posted up.

1454. Those are the regulations with regard to fire?—Yes, that is done when we go round at the annual inspection.

1455. This annual inspection is made with due notice given?—We tell them the day and the time when we are coming.

1456. Do you think it well that that should be continued?—It would be impossible for us to go over a theatre if we did not give them notice; we have to get the gasmen and a man with lamps to accompany us; we could not get about the place in the day time unless we gave them notice.

1457. But the office never inspects at other times for the purpose of seeing whether the regulations, which of course might be carried out during the day, are carried out during the night?—We have done so during this last pantomime season. The Lord Chamberlain requested me to go round with another officer, and to report on the condition of things.

1458. Did you find those regulations carried out?—No, they were not carried out in all cases. We had to report them again.

1459. Did you find that though they carried them out well at the annual inspection, they were not in good order when the performance was going on?—They fastened half of a door back, as one of the Committee has stated.

1460. You found that although your regulation stated that the doors should open outwards, they had been fastened back?—Yes, half of the door had been made perfectly fast. We had the door opened. When I noticed it, it was opened immediately.

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1461. That was in consequence of your having gone round by the instructions of the Lord Chamberlain to inspect, when you were not expected?—Yes, during the hours of performance.

1462. Have you made any report to the Lord Chamberlain upon that inspection?—Yes.

1463. Will you ask the Lord Chamberlain if he will put in that report which you made?—I will make that request to the Lord Chamberlain's office.

1464. Is there anything you wish to state with reference to the regulations as they are laid down?—I went through their rules, and made my own suggestions upon them.

1465. You would wish to make an addition to Rule No. 2, I understand?—I do.

1466. What alteration do you wish to make to Rule No. 2, which says: "All gangways, passages, and staircases, intended for the exit of the audience, to be kept entirely free from obstructions, whether permanent or temporary"?—I would add, "No passage to be less than 4 feet wide; if over 300 people the passage to be 12 inches wider for every additional 100. All passages and staircases to be of fire-proof material, and supported at both ends of the steps. No square corners on landings allowed. The flights of steps to be arranged in short lengths with handrails on each side. No winders (that is to say, angular steps) to be allowed on any staircase used by the public."

1467. I suppose you would make that addition as applicable to new theatres?—Yes.

1468. You would not propose to enforce that regulation with regard to old theatres?—Only where it was practicable.

1469. In most cases it would amount to a reconstruction, would it not?—Yes, I think it would be impossible.

1470. Then the next part is, "No part of the auditorium to be without at least two means of exit in case of need;" have you any addition to make to that?—Yes; "And of the width above named in Clause 2."

1471. Regulation No. 4 is: "All doors not habitually used for exit, but available as additional means of escape in case of alarm to be indicated by printed placards in plain characters;" what do you propose in addition to that?—"And to be kept open during all the hours of performances."

1472. That is what you have already stated. How would you amend Recommendation No. 5, which is: "An ample supply with hose and pipes to be available to all parts of the house where possible on the high-pressure main"?—Yes, I would amend that in this form, "Of such quality as to resist the high-pressure main.

1473. That they would be obliged to do for their own safety, of course?—They do not do it. The canvas is so slight, and gets so rotten when we inspect them, that I doubt whether they would be of use in case of need.

1474. Is there any addition to the sixth recommendation that you would make?—No.

1475. The seventh refers to the lights being protected by a wire guard, and that "sufficient space should be left between each ground line, so as to lessen risk from accident to all persons standing or moving amongst such lines." Would you add to that at all?—Yes, I would suggest: "The area above the stage to be not less than 12 inches clear of gas battens, border cloths, &c., the gas to be covered with wire of not more than one and-a-half inch mesh." That is to prevent the cloths and borders swinging over the gaslight, taking it 12 inches from the gas battens.

1476. That would add to the security of the existing state of things?—Yes, in lowering the cloths it would I think prevent it getting alight.

1477. By that recommendation you would insist that all gas that was used should be covered by wire?—I think that would be very necessary.

1478. The last witness stated that in some cases that would be impossible?—They could always order, if they liked, the wire guards to be put on.

1479. Then in your opinion that protection is necessary from the great risk of fire which arises from the lights not being covered?—Quite so.

1480. Now you do not propose to amend Regulation No. 8, but with regard to Recommendation No. 9, "Wet blankets or rugs, with filled buckets or water pots

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pots to be always kept in the wings, and attention to be directed to them by placards legibly printed or painted and fixed immediately above them," and some person to be held responsible for doing so. Is there any alteration you would make if you could in that regulation?—Yes; it says, "as in Rule 6, some person to be responsible." I say some person named to be held responsible. I think he ought to be named in all theatres.

1481. So that, if there were a penalty attaching to the infringement of this regulation, you would at once know who was liable?—Yes, you would at once know who was liable.

1482. Is there any other addition you would wish to add to that regulation?—Yes; I would recommend the counter-weights to be cased in at the side of the stage wall, and all ropes to be tested every six months and a certificate given of such examination.

1483. That I suppose is to prevent their falling down on the heads of the people below?—To prevent the counter-weights falling upon the heads of the artistes.

1484. Would you recommend anything with regard to the annual inspection made of theatres, in respect of giving power to inspect when it was not anticipated that you would be there?—I think a theatre should be inspected every month nearly.

1485. It would require a large staff to carry that out, would it not?—Not for London, but it would if you took the whole of the theatres in the country districts as well.

1486. The present form of Regulation 13 is: "No structural alterations to be made in the theatre without the sanction of the Lord Chamberlain;" would you propose to amend that at all?—I would strike the word "structural" out, and say, "no alteration affecting the public," because they move the partitions and the doors and various things which are not structural alterations.

1487. How would you define, "affecting the public." Would it not be better to say "any alteration from the form approved when the license was granted?"—Perhaps it would; I would rather leave that to the Committee.

1488. Is there any other recommendation you wish to submit to the Committee with regard to these regulations?—I make these suggestions more particularly with regard to theatres, not with regard to the Lord Chamberlain's regulations; I leave that to him.

1489. But the regulations being before us, you having suggested those points upon which you wish them strengthened, if there were power in anybody, whether the Lord Chamberlain or not, to inflict penalties for breach of those regulations, those are what you think the regulations ought to be for the safety of the public?—I would suggest these, and these are extra ones that I would name; that there should be a wall of not less than 14 inches thick dividing the stage from the auditorium and from the cellar, and through the roof two feet.

1490. That would be one of the regulations which ought to apply to any newly-constructed theatre?—Or to old theatres where the wall is in existence, that it should be carried right through the roof.

1491. Would that be possible on account of the foundations in many cases?—I cannot answer that question, but it would be generally possible where there was a wall.

1492. I suppose it would depend upon the foundations in each particular case, because although the foundation might carry a given wall it does not follow that it would carry double the amount?—Quite so.

1493. That is a regulation which you think ought to be enforced in all new theatres at all events?—Yes.

1494. Have you considered the question which was asked the last witness with regard to the curtain separating the auditorium from the stage?—That is my next suggestion: "A wire curtain, to be covered with strong wire, not more than 1½-inch mesh, counter-weighted, to go up in sections, or all in one if convenient, into a sheet-iron box above the proscenium, with every means of directing any person to close the curtain in case of need.

1495. You see no danger from the fact of that being seldom used, and getting so out of order, that when you relied upon it it would be unworkable?—I would

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—I would make them put it down every night when the performance was not on, the same as they do in Paris.

1496. In Paris do I understand that this wire curtain is used every night?—Every day and every night after the performance,

1497. It is merely drawn up during the performance?—Yes; that is one of the regulations of the Government before they allow a theatre to be opened. There must be a wire curtain in every theatre in Paris.

1498. Is there any other regulations you would wish to add?—Yes. "The top of the ceiling over the auditorium to be kept clear from properties, carpenters' shops, or other stores."

1499. For what reason would you suggest that regulation?—Because I think the accumulation of rubbish, &c., and careless men working up there, might set the place on fire.

1500. You could not protect it by making it fire-proof?—I think not, without injuring the acoustic properties of the theatre.

1501. Is there any other recommendation you would wish to make; for instance, would you apply these regulations to music halls as well as to theatres?—Yes; I would apply them to music halls, and to all other licensed places of amusement resorted to by the public.

1502. So that if any power should be given by any future Act to enforce the regulations if made, you think that these regulations should apply to all places of public amusement and resort?—Yes.

1503. Have you had submitted to you at any time any means of making the passages and other parts of a theatre fire-proof, so as when a fire broke out to restrict its spreading?—We have had various suggestions from time to time sent to us.

1504. What I meant by that was, have you tested any of those suggestions, and found anything which you could recommend as likely to increase the safety of the public by restricting the spread of a fire?—There is nothing better than a fire-proof ceiling.

1505. That would be a brick-arched ceiling?—A brick-arched ceiling, or concrete.

1506. Would you make your passage of that material?—I would make them of that, or of iron girders.

1507. You do not see any danger in an iron girder?—If covered with concrete, I think they are much safer than if exposed to the heat without covering.

1508. Then with regard to what an honourable Member asked about the pillars supporting the stage from below, do you think those should be made of concrete, or iron, or brick?—I think they would be as well made of hard wood, such as oak. I think staircases of good solid hard wood are equal, if not superior, to stone or iron.

1509. You agree with Captain Shaw when he states that he prefers a building in which the beams are of wood to one in which they are of iron where stone enters into the structure?—Yes, if the steps are not less than three inches thick, I should say they would be safer than if of iron or stone; that is to say, they would be safer for the public to get down.

1510. Mr. *Ritchie.*] Some question has been raised with regard to the outside doors opening outwards; you do not think there would be any difficulty about arranging that, do you?—I suggested that to the magistrates at Leeds last year, and they altered their regulations and allowed the doors to open outwards, to fold back against the wall. They would not previously allow any outside door to open upon the pavement; this rule was altered, and the door allowed to fold back against the wall.

1511. Even if they were not allowed, they could be made to open back close against the walls of the passage?—Yes, but it would be a dangerous thing to take any room away.

1512. When you went in at the pantomime, was it then that you asked for the hatchets and always found them?—No, that was at the annual inspection.

1513. Have you always found with the hydrants that there was a hose attached to them?—It was hung alongside.

1514. Of course a hydrant is not of much use unless there is a hose available?—No.

1515. Have

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1515. Have you been round to the Covent Garden Opera House?—Yes, I have.

1516. There are hydrants all round the circles, are there not?—Yes, and at the side staircases, and very good ones.

1517. But are there any hose hung to the hydrants?—Yes.

1518. Are you quite sure?—Yes, when we go round.

1519. But when you go round without notice?—I did not go round this year but to look at the exits and entrances to the pantomimes.

1520. I went to the opera the other night and I saw plenty of hydrants and no hose, but, of course, the hydrants are of no use without hose?—They generally have a cupboard close by to keep the hose in.

1521. Do not you think that it would be better to keep the hose screwed on to the hydrant ready for use?—I think that would be better.

1522. Your evidence goes to show that the annual inspection, at times when notice is duly given to the owners and lessees of a theatre, is not and cannot be a proper inspection at all?—It has been the means of improving theatres very much indeed.

1523. But I am putting it in this way, that your inspection in the daytime does not at all guarantee that the precautions which you see then are used when the theatres are full?—We make the suggestions, but we do not know that they are carried out till we go the following year.

1524. I wish to ask you whether you find a considerable difference in the arrangements when you go round in the daytime, when the managers know you are coming, and when you go round at night, when they do not know you are coming?—Yes, in some of the theatres.

1525. In any alteration of inspection you would recommend that at least some of the inspection should be made at night, when the performance is going on?—Yes, without notice.

1526. Mr. *Onslow.*] With reference to this wire curtain in the Parisian theatres, are you of opinion that that is efficacious in case of fire?—I am of opinion that if the fire was on the stage it would protect the audience for half an hour, if not more.

1527. If that were so, it would be sufficient, in your opinion, to protect them altogether from loss of life?—Yes; the audience would get out before they would come to any harm.

1528. With regard to the Brooklyn fire, the first recommendation here is: "In the erection hereafter of any building intended for theatrical purposes, there should be a brick wall, extending from cellar to roof, dividing the stage from the auditorium"; that is what you have recommended?—I have recommended that.

1529. Have you inspected any of the music halls in London?—No, I have not inspected them.

1530. Have you constructed any?—I have altered one or two; I have not built any new ones.

1531. Which have you altered?—The Cambridge and the Foresters'; they are East End music halls, and very large ones.

1532. In your alterations, have you taken into consideration the matter of fire?—No.

1533. Speaking generally, do you think music halls in London at the present time are sufficiently protected in case of fire?—I think not; they are nothing near so well protected as the theatres are.

1534. And there is no inspection *quoad* fire of any music halls?—I believe there is no inspection of any sort, except the district surveyor's, when they are built.

1535. Not even by the magistrates before they grant the licenses?—Not at all. I believe the police give evidence about the conduct of the place, which is considered sufficient.

1536. Do you think that those music halls which you have altered are sufficiently protected with the public in case of fire?—I think they are equal to any others.

1537. You said just now that you did not think much of the others?—I do not.

1538. *Chairman.*] I suppose you were acting under plans approved of by the managers?—That was all.

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1539. Mr. *Onslow.*] Do you think it a good and efficient inspection when you have given notice to the theatre managers that you are going round?—I think we should go round in the evening without notice, but I think it is impossible to go round in the daytime without notice; the theatres are generally dark and very inconvenient places to get about.

1540. Considering the performance takes place at night, do not you consider the inspection will be more efficient if it took place during the performance?—We could not inspect a theatre during the performance as well as we could in the daytime.

1541. Why not?—It would be an inconvenience to the audience if we were opening every door, and going across the stage.

1542. You might go about the stage when the curtain was down?—But for an examination and general inspection of the doors and exits, I think the daytime would be the best, but I would go at night to see if they had carried out our suggestions and recommendations.

1543. Are there any appliances in those music halls in London, such as hydrants, to which hose can be attached or any other appliances?—In some I think there are, but not generally.

1544. May I take it that it is your opinion that as a rule the construction of music halls is totally inefficient in case of a fire breaking out, for the protection of the public?—Yes, I do think so.

1545. Mr. *Clifton.*] There may be exceptions?—There may be exceptions.

1546. The Canterbury Hall for example?—The Canterbury Hall is a new one.

1547. Mr. *Onslow.*] Do you know the construction of the Canterbury Hall?—I have been there once.

1548. You could not speak as to its details?—It would not pass for a theatre; there are many little things that the Lord Chamberlain would not pass.

1549. Do you know any one music hall that the Lord Chamberlain's Office would pass?—I do not.

1550. Sir *Henry Peek.*] In the theatres where there are hydrants there are regular men told off who understand those hydrants, are there not?—In some theatres.

1551. In the event of fire they would know which of the servants of the theatre was competent to go and attend to them?—Only where firemen are kept.

1552. In what proportion of the theatres are firemen kept?—Perhaps in five or six throughout London.

1553. Out of the 40 which are under the Lord Chamberlain?—Yes, out of the 40.

1554. Therefore the other 35 are without firemen?—They are.

1555. And nobody is there who knows how to work the hydrants; is that so?—I do not know unless the men do; it is very simple; they have only to turn on the water and use the hose, but there is no proper man named to take charge and use it, unless it is done by the manager.

1556. You would suggest that a theatre should be inspected monthly?—I would not make it a stated time; I would go at any time throughout the 12 months.

1557. Would the expense of that be any objection to it in the Lord Chamberlain's office?—Yes, a great objection to it.

1558. I suppose you have a private practice besides your connection with the Lord Chamberlain's office?—I have.

1559. Did I understand you to say that music halls are not inspected by anybody?—I believe not.

1560. And that when they go for licenses to the magistrates the police merely give them a character for decency?—I believe that is all that they have to do to renew their license.

1561. Do the magistrates never ask any questions at all as to the safety of the public?—I do not know anything about that.

1562. *Chairman.*] Have you from your knowledge altered any music hall in which the manager was complying in those alterations, with the decision of the magistrates?—No; the only party that we have to contend with is the district surveyor.

1563. Sir *Henry Peek.*] And so far as you know the district surveyor has nothing whatever to do with the safety of the public from fire?—Yes, he has to see the Metropolitan Building Act carried out,

1564. Mr.

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1564. Mr. *Clifton.*] Do not you think that for the absolute safety of a theatre it ought to be provided with hydrants?—Yes.

1565. Hydrants supplied from the main?—From the high-pressure main.

1566. You do not think that cisterns on the roof are sufficient?—They are perfectly useless, I consider.

1567. Do you know of any theatres which are protected by cisterns?—Yes, there are several now which are so protected, five or six or more.

1568. The great majority are protected by cisterns?—No I think the great majority now are protected from high-pressure mains.

1569. At the yearly inspection is there any stress laid upon the necessity of hydrants?—I always put in a recommendation that they should go upon the high-pressure main.

1570. In certain cases that recommendation is not carried out?—It is impossible to get it, perhaps, because the high-pressure main is not in the road.

1571. Can you tell me whether there is a high-pressure main in King William-street, Charing Cross, or the Strand?—There is not one in King William-street; the manager is quite willing to put up a hydrant as soon as the main is in the street.

1572. Is it in the Strand?—Yes, it is in the Strand.

1573. What distance would they have to carry it?—Perhaps 100 feet, or a little more.

1574. Do you consider that the exits of the Charing Cross Theatre, in case the front part of the theatre caught fire, are sufficient?—It depends upon what part of it took fire; if the whole of the front part were to take fire they could not get out.

1575. There is no exit from behind?—No; there are two exits in front.

1576. Only two exits?—That is all.

1577. A former witness, I think, said that every theatre had three exits?—There is a gallery and pit exit which come into one.

1578. And the stage?—And the stage exit is a separate one.

1579. Then, virtually, there is only one exit?—There are two exits; one for the boxes and the stalls and the dress-circle, which can be used by the gallery and pit as well in case of need, and one for the stage.

1580. But in case of the front part of the building catching fire everybody would be burnt?—I do not know how they would get out.

1581. How wide are the three or the two exits put together?—Perhaps nearly 20 feet.

1582. How large is the smallest?—About eight feet I should say; the other would be about 12 feet.

1583. The lime light is very frequently used in theatres, is it not?—Yes.

1584. Do you think it safe to have a gas holder in the theatre containing the oxygen and the hydrogen?—I think it would be safer if it were outside.

1585. You do not think it absolutely unsafe?—I think it is unsafe inside a theatre.

1586. But it is the case, is it not, that they are mostly inside?—Yes, I think in many of the theatres they are inside.

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Monday, 16th April 1877.

MEMBERS PRESENT:

Mr. Clifton.	Lord Lindsay.
Mr. Forsyth.	Mr. Locke.
Sir William Fraser.	Mr. Onslow.
Mr. John Stewart Hardy.	Sir Henry Peek.
Mr. Hayter.	Mr. Ritchie.
Sir James M'Garel Hogg.	Sir Henry Selwin-Ibbetson.
Mr. Kinnaird.	Mr. Young.

SIR HENRY SELWIN-IBBETSON, BART., IN THE CHAIR.

Mr. *Charles John Phipps*, called in; and Examined.

Mr. *C. J. Phipps.* 16 April 1877.

1587. *Chairman.*] You are an Architect, I believe, employed very often in the construction of theatres in the metropolis?—I have built four theatres in the metropolis; in other parts of the country I have built 12 theatres, and reconstructed four others.

1588. Are you well acquainted with the system of licensing for theatres in the metropolis?—I think I am.

1589. And as such you can speak to the fact of how far the construction of those theatres enters into the question of licensing?—Perfectly.

1590. Do you think that the construction of theatres, looking at the matter with regard to what is referred to this Committee, namely, the protection of the public in case of fire, is in a satisfactory condition?—I think that the present mode of licensing by the Lord Chamberlain is very adequately carried out indeed; that is to say, I think that the inspection of plans before the building is erected, and also the inspection of a building before it is opened to the public, is certainly very satisfactory, because it is perfectly carried out.

1591. That, I suppose, applies to the construction of new theatres?—That applies to the construction of new theatres only.

1592. With respect to old theatres, I suppose many of the conditions which are made a part of the Lord Chamberlain's license in new theatres can hardly be carried out?—Not without a radical alteration.

1593. Could you state from your own knowledge what are the principal points on which it would be impossible to bring the old theatres within those conditions?—I do not say that it would be impossible to do so.

1594. But you say "without radical alteration"?—That is to say, all wood partitions would have to be made into brick walls, and wood staircases into stone staircases, and the various parts of the auditorium and the stage more completely divided.

1595. Would that imply the reconstruction almost entirely of the theatres in consequence of the foundations not being able to carry the additional weight?—I think not.

1596. But you think many of those improvements might be introduced on the existing foundations?—Certainly.

1597. I suppose you think that those improvements are a great protection to the audience in case of a fire arising?—The principal one, which I consider a great protection, would be having a solid brick wall between the auditorium and the stage carried right through the proscenium to the roof.

1598. Do you think that would be possible in all cases upon the existing foundations?—I do think so.

1599. Would you suggest, from your knowledge of the way in which that inspection is now carried out, and the power of enforcing the conditions which the Lord

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Lord Chamberlain requires, any alteration in the inspecting authority?—The only alteration I would wish to suggest is that the inspection should be carried out oftener, and by a perfectly impartial person; that is to say, a skilled professional man untrammelled by private practice.

1600. You say you would separate the inspection of the construction of a theatre from the licensing of that theatre?—Entirely.

1601. And you agree with Mr. Ponsonby Fane in his evidence to the Committee that the Lord Chamberlain's office should be relieved from any part of the examination as to the construction of theatres?—I do most entirely.

1602. And that it should be placed in the hands of an independent body, who should certify with reference to the construction of theatres before a license could issue?—That is entirely my view.

1603. Do you think that ought to be a body appointed by a local authority, or by the Government?—Entirely by the Government. I think very much after the way that the inspectors under the Board of Trade are appointed.

1604. In the same way as their inspection of railroads is carried on?—That is entirely my view.

1605. So that any regulations which might be laid down would be regulations to guide those gentlemen when appointed in their certificate as to the construction on which the license would ultimately issue?—That is so.

1606. Do you think the same rule applies to the music halls as well as to the theatres of the metropolis?—I think so.

1607. From your own knowledge, can you tell the Committee what the number of those music halls is in proportion to the theatres?—I cannot.

1608. I believe there are not a very large number of music halls where representations take place?—There are not very many of them.

1609. And you think that all those ought to be placed for the purposes of construction on the same footing?—Not only theatres and music halls, but concert halls, and all those places, should be placed upon the same footing entirely.

1610. I suppose you would not propose to extend that survey to the public-houses where a music and dancing license is often granted?—I think I would.

1611. You would extend it to all places applying for a music or dancing license?—Entirely.

1612. Upon the ground that when people assemble in large numbers the same security should be given?—Quite so.

1613. What would be the extent of the area to which this inspection should apply?—My opinion is that it ought to be applied to the whole country; the same inspectors that were appointed for the metropolis could also go through the United Kingdom.

1614. Would not that imply a very large staff of officers?—I think not.

1615. In fact you would remove from the local authority in the different towns throughout the country the control over their theatres, and would give it, as far as the construction of those theatres was concerned, to a Government authority?—To a Government authority.

1616. At least you would render it liable to a Government inspection?—I would.

1617. I suppose this body which was appointed ought to be skilled in architectural knowledge?—I think they should be.

1618. And that it should be purely an inspection for professional and architectural purposes?—A professional inspection.

1619. And that body ought to be distinct from any private practice?—I think it is a very important thing that the body should be distinct from any private practice.

1620. In fact they should be appointed merely for their particular knowledge, and be confined to their Government work?—Entirely, so I think.

1621. How would you bring applications before them; on plans submitted to the office?—In the case of a theatre or of a new building of any of those classes, then the plans would be laid before those inspectors in the same way as plans are now laid before the Lord Chamberlain in London; that is to say, parties applying with those plans should obtain a certificate from the inspectors before they applied to the licensing authority.

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Mr. C. J. Phipps.

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1622. But the plans would be passed in the first instance by the Government board, and that board would afterwards inspect on completion, before the certificate went in for the license?—Exactly so.

1623. Would you require inspection by those officers at other times than on the issuing of the license?—I think it should be a constant inspection, at the very least twice a year.

1624. That the officers should inspect at certain times in the year, to see that the conditions on which the license had issued were carried out?—Quite so.

1625. I suppose you would propose in that case some alteration in the law, so as to enforce those conditions by a less severe penalty than the taking away of a license?—I think so; that is the view that Mr. Fane suggested.

1626. You agree with Mr. Ponsonby Fane that the enforcement of the regulations should be made a police penalty, so that a smaller fine should follow than the withdrawal of the license in the case of an infringement of those regulations?—That is so.

1627. I suppose that this body of officials would have to inspect in the case of a fire at any of those theatres and report upon it; that would be one of their duties, would it not?—Yes, that would be one of their duties, and also in case of any accident whether involving loss of life or not.

1628. So as to see whether such accident or such fire arose from any breach of the regulations?—Quite so.

1629. Would you limit that remark to a serious fire, or would you make it obligatory upon them to inspect in case of any fire, however small?—In the case of any and every fire.

1630. In theatres, I suppose, especially about pantomime time, a good many fires are put out almost instantaneously?—I do not mean that; I mean anything involving say, a claim upon the insurance offices.

1631. Or a panic amongst the audience?—Yes.

1632. Do you think that conditions might be laid down of a satisfactory nature which would apply generally?—I think so.

1633. What would you suggest that those conditions should be?—The condition of safety of the building.

1634. Conditions of safety to guide the construction?—There are a great many conditions. I have sketched out a few which I would like to mention, but I think that that is a question which ought to be laid before a committee of experts to obtain a really satisfactory decision upon that point.

1635. It would follow upon the appointment of a body that the Government who appointed them would have to decide upon those regulations, and possibly it would be necessary to take the opinion of other people before they drew up their rules?—That would be so.

1636. I suppose that the principal points are rather with regard to the building, as you have stated, than with regard to the audience?—As regards the building first, and also as regards the audience, and the plan and arrangement.

1637. With regard to the plan and arrangement, do you mean the plan and arrangement of that part where the audience is, or the plan and arrangement of the general theatre?—The plan and arrangement of the general theatre; the scheme of the theatre.

1638. And as to the storage of materials?—Yes.

1639. And the way in which those places were protected?—Yes.

1640. I suppose some of the present theatres are, from their limited space, not provided with sufficient fire-proof places for the storage of those materials?—I am not aware of any theatre where there is a fire-proof place for the storage of those materials.

1641. That is a thing which is very important, because, as a rule, fire arises more in those places than anywhere else; and the power of limiting a fire on its breaking out to the place in which it arises is most important?—I think so. For that purpose I think that all divisions of a theatre should be kept as far as possible distinct, very much in the way that Captain Shaw suggests in his pamphlet, that is to say, that the building should be made into several risks.

1642. Do you mean that the different parts of the audience should have, as a matter of course, separate entrances?—I mean more than that. I mean that the building itself should be divided into several risks; that is to say, the dressing-

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dressing-rooms should be one risk, the stage another, the auditorium another, and the corridors, entrances, and the saloons another.

1643. You mean for the purpose of fire insurance?—Yes, and for the purpose of safety to the audience also.

1644. What do you imply by "risk?"—I used the word "risk" in the way the fire insurance offices, perhaps, would use it.

1645. Do you mean that in the different parts in which a theatre is constructed a different safety should be arrived at?—No, I mean that if a fire broke out in one of those compartments it might be localised within that compartment.

1646. You would make the separations as between the different parts where the audience were assembled fire-proof in their construction?—Quite so.

1647. Have you, in your experience as an architect, had many of those schemes before you for making theatres fire-proof practically?—Many, more particularly as regards the floors.

1648. Has there come to your knowledge what was submitted to this Committee with regard to that preparation spoken to by Mr. Penrose, the architect in charge of St. Paul's Cathedral, called "stone-felt"?—I have not seen that preparation.

1649. Mr. Penrose placed before this Committee a statement that he had tested this particular material, and to show that he had satisfied himself in respect of it, he had applied it to the roof of St. Paul's, and he said, with this material, you could overlay existing walls, or create fresh walls which would be absolutely fire-proof?—I have not seen or heard of that material yet.

1650. You have not heard of it under the name in which it first came out as "Brennon's patent"?—No, I have not. It has never been submitted to me.

1651. But if such were the case, and if future experiments tested it with the same results, you might apply such a preparation to existing theatres with much advantage?—Certainly.

1652. I suppose one of the advantages to the owners of theatres, as well as to the public, of any recognised scheme on which those regulations were carried out, and on which theatres were built would be, that it would do away with the constant attempt to bring them, piece by piece, under the regulations of the Lord Chamberlain?—I think so; but even theatres which are under the regulations of the Lord Chamberlain have constantly alterations made in them year by year, or rather recommendations are made for alterations year by year, after every great fire.

1653. That is to say, you would suggest to the Committee that moments of panic produce alterations, of which many are not fully justified by experience?—Quite so.

1654. And that therefore there is a great strain put upon managers to do things which may not ultimately prove satisfactory?—I think so. I have several orders from the Lord Chamberlain's office in my hands now, since this Brooklyn fire, with regard to three or four of the theatres, which were not thought of previously.

1655. Will you state what those suggested alterations were?—I will read one of the letters if the Committee will allow me to omit the name.

1656. First, I would ask this: are those not included in the rules for theatre licensing by the Lord Chamberlain which were put in by Mr. Ponsonby Fane?—I do not think so. I do not think there is any clause to that effect. This is a letter dated the 8th January 1877: "Sir,—I am desired by the Lord Chamberlain to direct that the accompanying requirements may be carried into effect at once, and that you will inform his Lordship when they are completed"; and then follows a schedule of what they are. "It must also be understood that before the next issue of the annual licence to ——— Theatre, the proscenium staircases must be supported at the outer ends by iron girders." I hold similar letters to two theatres in my hand, in one of which the plans were passed by the Lord Chamberlain, and this staircase was also passed, and these theatres have been in existence a considerable number of years, and at the annual inspection no notice had ever been taken of them until the Brooklyn fire.

1657. With regard to that, from your professional experience, do you think

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that iron supports of this kind, unprotected, as I suppose they would be from that letter, would be any great additional security?—I believe they would be worse than useless.

1658. And you mention that in order to illustrate the fact that moments of panic produce orders which really might be better considered if they were dealt with in the way you suggested, namely, by a board whose duty was to license theatres which were proposed to be constructed?—That is my opinion.

1659. I am requested to ask why you would say that iron was worse than wood in case of fire. I suppose you would agree with Captain Shaw in that respect?—It would pull down the staircase in all probability. If the staircase is unsafe, I would say, put up wood supports rather than iron.

1660. I suppose to follow that out, you would agree with Mr. Robinson that a good wood pillar would be even safer than an iron one in case of fire. With regard to the parts under the stage, when he was asked whether the existing wood pillars (oak pillars in some cases) would not be better if altered into iron or other material, he stated that he believed wood would be more serviceable in case of fire as a protection?—I agree with that, but there is also another reason, wood pillars under the stage are liable to constant alteration; they are constantly moved, and that would be one reason why iron would be objectionable.

1661. At the same time I suppose you could move an iron pillar in the same way as you could a wood pillar, by making it a temporary support?—That might be so, but I think it would be very unadvisable to put iron under the stage.

1662. The whole matter turns upon this: if a fire breaks out, which would be most likely to maintain the stage for the longest time?—Wood, I believe.

1663. I suppose you attach much importance to the number of exits which there should be for the audience from the theatre?—I attach greater importance to a straight way of exit, and to the position of the exit, than to the number of exits.

1664. You say that there should be a direct unmistakeable exit from each portion of the auditorium?—A distinct and unmistakeable exit from each part of the auditorium.

1665. It should be perfectly self-evident to the audience either by notices or other means that that entrance was available in case of panic?—Yes.

1666. Have you formed any opinion with reference to the width of the passages which should lead to such a door?—I think there should be no passages less than four feet wide, but I think the standard width would be about six feet.

1667. I suppose you would agree with the other witnesses, that the width should never be increased inwards; that it should be always increased outwards?—The width should be always increased outwards.

1668. And that the exit doorway should be the greatest width of the whole passage?—Yes.

1669. Are there any other points which you would wish to suggest to the Committee?—The only point which I should like to mention would be in respect of licensing music halls and theatres.

1670. If you placed the music halls and theatres under the same conditions with regard to construction, do you think that their licensing might be entrusted to the same body or not?—I think it ought to be.

1671. That all licenses should issue from the same authority?—Yes; that all licenses should issue from the same authority, and that the inspection should be from another inspecting authority, that is to say, the licensing for the music-halls should be from one authority, and that the inspection of music halls should also be under another authority.

1672. That is to say, the inspection should form a part of the new office that was to be set up, and that that inspection would apply to both music halls and theatres?—Yes.

1673. But you think with regard to the license which should issue after that inspection, that that license should be from the same authority in all cases?—I do think so

1674. And that authority to be the existing one of the Lord Chamberlain?—I think that is much better than the jurisdiction of the magistrates. I might mention one case in which an application was made to the magistrates for a license

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licence for a music hall in the east of London, by myself, which was refused, and an application was made immediately afterwards to the Lord Chamberlain for a theatre, and, after a slight modification of the plans that was granted.

1675. When application was made for a music hall to the magistrates, were plans of the building submitted to the Bench?—I was present at the Middlesex Court with plans in my hand, but they were not even asked for.

1676. That application was made by the proprietor, was it not?—Yes; the application was made by the proprietor.

1677. And the Bench, without considering the question of construction, decided against the licence?—That is so; upon that I immediately took the plans to the Lord Chamberlain.

1678. And were the plans gone into by the Lord Chamberlain?—The building was finished by that time, and I took the plans to him and requested an inspection.

1679. Did the Lord Chamberlain's officer inspect the building?—Certainly.

1680. And being satisfied after the inspection?—Being satisfied after a certain modification was made, which was separating entirely the tavern from the entrances to the theatre, he granted a licence to that building, which has now been in existence for seven years.

1681. I do not know whether you mentioned the name of the theatre; was not it the Alhambra?—No; it was the theatre called the Variety Theatre at Hoxton; that is the only case under my own knowledge.

1682. There was another case, the case of the Alhambra, I think, in which the magistrates refusing the license, the Lord Chamberlain granted it?—I believe so, but that is not within my own knowledge.

1683. Within your own knowledge there was one case in which, after the magistrates refused, on inspection by the Lord Chamberlain a licence for a theatre issued?—A license for a theatre issued after a certain modification had been made; that is to say the Lord Chamberlain insisted upon the tavern being entirely separated from the entrances to the theatre, that it should be made into two distinct buildings.

1684. That was in accordance with the rules which the Lord Chamberlain has always laid down with regard to theatres?—Yes.

1685. You give that in evidence to the Committee as showing that, in your opinion, the Lord Chamberlain's licence issues upon a better security to the public by means of inspection than that which frequently occurs when application is made to the Bench?— That is my view of it.

1686. Is there any other point which you would like to place before the Committee?—I do not think I have anything more to add.

1687. Mr. *Onslow.*] What is the last theatre which you built?—The last theatre which I finished was the Royal Theatre at Edinburgh.

1688. How many theatres have you built in London?—I have built four theatres in London; the Gaiety, the Queen's, the Vaudeville Theatre, and the Variety at Hoxton

1689. In the construction of all those theatres you have borne in mind the subject of protection from fire?—I have endeavoured to do so.

1690. In any of those theatres have you built a brick wall extending from the cellars to the roof to divide the stage from the auditorium?—In nearly all of them.

1691. In which theatres in the metropolis have you not so constructed the wall?—In London, the Variety Theatre and the Vaudeville have not that wall between the stage and the auditorium entirely through the roof.

1692. Was that on account of economy, or on account of bad foundation?—It was on account of economy.

1693. Do you think it is safe that a modern theatre should be built without that wall?—It is safe, but I think that it is better with it.

1694. Should you recommend that the inspection of theatres by the Lord Chamberlain's office, or any other office, should be by night or by day?—The inspection of theatres must be by day in the first instance, but I think that the inspector should have the liberty of going in at night also to see how things are carried out.

1695. You are aware, no doubt, that there is no night inspection at the present time?—I am aware that there is no official inspection at night.

1696. When the lights are burning all over the theatre, both the footlights

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and the stage lights, and elsewhere, would not that be the better time to carry out the inspection?—I do not think so; you can inspect the condition of a theatre quite as well in the daytime as at night. You can see if the doors open outwards better than at night, when all is confusion and bustle.

1697. But surely you do not want to see whether the doors open outwards or inwards; you want to see if the regulations of the Lord Chamberlain are carried out when a theatre is filled with people?—Sometimes it would be very difficult to make the inspection properly.

1698. For the carrying out of the rules which the Lord Chamberlain has laid down, which rules, I presume, are for the use of the public when a performance is going on, would it not be better that the inspection should be by night, so that the Lord Chamberlain might see whether those regulations were or were not carried out?—I think that the inspector should have the privilege of going into a theatre whenever he liked, and of course he would go in at night.

1699. Are you aware of any theatres in London in which naked lights are used?—Naked lights are sometimes used on the ground rows; that is to say, there is a loose pipe placed along upon the stage where there are naked lights; they are what are called the ground rows. I think you will find that in the Lord Chamberlain's regulations. Regulation No. 7 is: "The first ground line to be always without gas, and unconnected with gas, whether at the wings or elsewhere"; those are what are called the ground rows.

1700. According to this regulation you might have naked lights used?—Certainly; as a matter of fact they are always used.

1701. In the theatres of London which you have constructed, what is the least number of modes of egress?—Three; the Vaudeville is the smallest; there are three modes of egress there; one of them is very large.

1702. One from the stage, one from the gallery, and one from the pit?—And one from the upper circle and the dress-circle; that is four for the whole theatre.

1703. Do you mean by that, four separate doors into the street?—I mean by that, four separate doors into the street; one of which is 12 feet wide.

1704. When you have a full performance, in what time do you think the theatre could be cleared?—As a general rule, the audience in most theatres are out into the lobbies in three minutes, and the whole theatre is generally cleared in six or seven minutes.

1705. In the case of a panic, of course, the time must be extended?—You cannot calculate that.

1706. Have you had any experience in the construction of music halls in London?—No, I have not.

1707. Have you inspected any music halls?—I have been into music halls in London, but I have not inspected them in a professional way.

1708. Is it the case that if the Lord Chamberlain were to refuse his licence for a theatre, the proprietor might go to the magistrates, and the magistrates, knowing nothing of the refusal of the Lord Chamberlain, might assent to have the place turned into a music hall?—I suppose he could do so. I am not aware that it has ever been done.

1709. Have you read the recommendations of the Brooklyn committee?—I have not. I have simply seen the reports in the newspapers.

1710. Sir *Henry Peek.*] I think you stated that theatres should be inspected more than once a year?—I think so.

1711. How often would you suggest that theatres should be inspected?—At least twice a year, and always once before the annual licence.

1712. Did I understand you to say that as regards the inspection of construction, you would tar the theatres and music halls, and the public-houses having music and dancing licences, all with the same brush?—I would do so with regard to construction, but I would not include the public-houses attached to music halls, because they are entirely separate.

1713. Could you give the Committee the number of music halls, concert halls, and public-houses with music and dancing licences in London?—I could not give the number; there are 40 theatres, I understand, in London.

1714. In the case of the Variety Theatre at Hoxton, where the Middlesex magistrates declined to give a licence, do you know why they declined to give a license?

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a licence?—I do not know at all; so many hands were held up for the licence, and so many against it.

1715. It might have been on moral grounds?—A licence already was given to the public-house; it might have been on moral grounds; I cannot say what the reason was.

1716. Then, according to that, the Lord Chamberlain does not care two-pence about morals?—I think the Lord Chamberlain is extremely particular as to whom he gives a licence to.

1717. You say it might have been upon moral grounds that the Middlesex magistrates refused the licence?—I do not think it could have been upon that ground. I know that the man who applied for a licence was a very proper man to have one.

1718. Mr. *Clifton.*] Do you not think that, by your system of inspection, having a regular staff of inspectors, there would be a tendency to take the responsibility off the managers?—I do not think so at all; there is at the present time an inspection in London.

1719. You do not think that that clears a manager at all from the responsibility of an accident which may occur?—I do not.

1720. Do you think that the Metropolitan Board of Works with their staff would be able to inspect the theatres?—I think not.

1721. What are your reasons for thinking so?—I do not think I ought to mention any reasons for saying that, but I think the architect for the Metropolitan Board of Works will tell you that he has quite enough to do without inspecting theatres.

1722. Did you say that you built the Gaiety Theatre?—I did.

1723. Was that the theatre which is connected with a sort of *café* and refreshment place?—The Gaiety Restaurant is attached to the Gaiety Theatre; that is to say, it is built upon the same block of ground.

1724. I think you were obliged to cut that off from communication with the theatre before it was licensed, were you not?—No; the Lord Chamberlain objected to licensing more than a certain part of the building. I beg leave to show a plan of the building to the Committee (*producing a plan, and explaining the same to the Committee*). We then applied to the magistrates to license the other part as a tavern, both of which licences were granted.

1725. By that means was not there a very good exit stopped from the Gaiety Theatre?—When both of those buildings were licensed, and for five years afterwards, there existed a means upon every level of the theatre by which the audience could go down through the restaurant staircase, but since the passing of the last Licensing Act the magistrates have refused to renew the licence of the tavern until that exit was cut off.

1726. That would be a case in which there is a clash of authority between the Lord Chamberlain and the magistrates?—It is so entirely.

1727. Do not you think that better steps might be taken to protect a theatre by science, such as using iron and stone staircases, instead of wooden ones?—Stone staircases would be better, if they were enclosed in brick walls.

1728. I think you say that a dividing wall should be always put up between the proscenium and the other part of the theatre?—I think it would be better, because it would prevent the spread of fire from the stage to the roof of the auditorium.

1729. Do you know whether that affects the charges for insurance?—Theatres built upon that principle are insured at a very much lower rate than those which are not so.

1730. Is the Gaiety insured at a lower rate?—The Gaiety Theatre is insured at a lower rate than any other theatre in London.

1731. Sir *James M'Garel Hogg.*] I think you stated that you agreed with Mr. Ponsonby Fane, that his department ought not to be burdened with the inspection of theatres, as regards their construction and safety from fire?—I entirely agree with him.

1732. I think you also stated that either a new department ought to be formed or that this duty should be thrown on the Board of Trade?—I think I said that a new department ought to be formed.

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1733. And not that the duty should be thrown on the Board of Trade?—I do not go so far as that.

1734. Then, of course, if there is a new department, you must create a new staff of officers?—Of course.

1735. Are you not aware that London is at present divided into 63 districts under district surveyors, all of whom have certificates from the Society of British Architects?—I am quite aware of that.

1736. Do you think that those gentlemen who hold those certificates are incompetent to look at and inspect theatres?—It would be placing more upon their shoulders than they have at present; it would be going out of their line because they are all practising architects.

1737. Have you any reason to suppose that those gentlemen would not be able practically and efficiently to inspect the theatres?—I do not say that, but I think that there should be an expert appointed simply to inspect theatres.

1738. I ask you why you think they would not be efficient gentlemen to perform that duty?—I think they would be only efficient when they had learnt their duties.

1739. Do you think they require some fresh knowledge?—Yes.

1740. Do you think that a gentleman who had a certificate from the Society of Architects, would require another certificate to enable him to inspect theatres?—He would not require another certificate, but he would require special experience.

1741. You hold a certificate, do you not?—I am a Fellow of the Royal Institute of Architects, but not a district surveyor.

1742. Should you not think an architect a proper person to build a theatre?—You want somebody to look over it after construction.

1743. If he were able to look after the construction, he would know something of the construction?—No doubt.

1744. Then I suppose you would allow that these 63 gentlemen would not be inefficient persons to inspect theatres, holding as they do certificates from the British Society of Architects? — They would not be inefficient persons, of course.

1745. Do you think it would be better to supersede the local authority and create a new department, in preference to utilising the existing officers in London?—I do.

1746. Do not you think that such a change would be a very great expense?—I think that three or four inspectors might not only inspect London, but the whole of the United Kingdom.

1747. You think that four inspectors could inspect London, and the whole of the country?—Yes, I do.

1748. Who do you think should bear the expense of those four inspectors?—Primarily the Government; but then there would be a certain return by way of fees for the licences.

1749. You think those inspectors should be paid out of the public purse, as a public department?—Yes.

1750. You think that all the local authorities of all the towns in England, Manchester, Liverpool, and everywhere else, should be superseded by a Government Department to look after theatres?—At present there is no department in any of those towns which does look after theatres.

1751. Do not you think that mayors and corporations, who so efficiently carry out their local government, could very well look after the theatres?—In my experience there has been only one town, namely, Edinburgh, where there has been any inspection whatever of a theatre.

1752. If they carry out their local government effectively, why could not they look after that department?—If they were ordered to do so, probably they could, but I believe it does not come under their province at present.

1753. You said, in answer to one of the honourable Members, that you thought the architect of the Metropolitan Board of Works would have enough to do without inspecting theatres?—Of course I cannot answer for your architect. I should prefer that he should answer for himself.

1754. I would ask you, is it not the case that every new building, and every building in London which is altered, is done under the authority of a certificate from that architect?—Certainly.

1755. If it is the case that every alteration, and every new building in the large

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large area of London, is done under his authority, would you say that the inspection of the construction of theatres might not be done by him, with the large staff he has at present?—Then, I would ask, how is it that the Lord Chamberlain requires an inspection, because he has one at present.

1756. I asked you with regard to the inspection; they are now inspected by the Metropolitan Board of Works, when a new theatre is built; are you aware of that?—Yes.

1757. You think that the new department which you suggested ought to go round to the old theatres, and invite the managers to make alterations?—If the condition of the theatres, as they at present stand, are not in accordance with the conditions of safety laid down by the Government, and this Committee.

1758. Would you go so far as to say, "I would shut up those old theatres, because I cannot get exactly what I want in every way"?—I would not go quite so far as that.

1759. How far would you go?—I think the managers of theatres should have notice to make them safe.

1760. But if they could not do it?—Then I think such a theatre should be shut up.

1761. Mr. *Young.*] I understand that you are of opinion that the district surveyors of the metropolis are qualified architects, competent to do their work?—Certainly; all of them hold a certificate of competency.

1762. Then from what class of persons would you get this superior article to do this inspection better?—It is not a superior article; it is the same article, only specially designed for that particular work. I would get them from precisely the same source.

1763. You think that a gentleman who is now performing the duty of a district surveyor might be taken away from that duty and confined to this, and that he would be the proper person to do it?—A gentleman who was an architect.

1764. I presume that they are all architects?—Not all of them.

1765. You wish to take a man from his every day business and put him exclusively to this work?—I wish to have a special person, whether he is a district surveyor or not.

1766. But you admit that the district surveyors are people who are architects and capable of doing the work which is now laid upon them, which is the duty of reporting upon the alteration of every house in their district?—It is so.

1767. Respecting the divided authority which there seems to be in granting licences between the Lord Chamberlain and the magistrates, have the public any opportunity of being heard before the Lord Chamberlain?—No.

1768. Whereas they have before the licensing magistrates?—Yes, they can appear by counsel.

1769. I have observed myself in theatres that great inconvenience, and I should have thought danger, arises from all the vacant spaces and passages round where the audience can see, the stage being blocked temporarily by chairs; have you observed that at all?—I have in many theatres.

1770. Are you of opinion that that is detrimental or dangerous to the good government of a theatre?—It is detrimental, and might be dangerous in the case of a panic.

1771. Is there any authority to prevent that?—There is no authority, except the Lord Chamberlain's regulations.

1772. It has not been provided for?—It has been provided for since the last great fire.

1773. Mr. *Forsyth.*] Do you agree with Mr. Ponsonby Fane with reference to the superior safety of underground theatres like the Criterion Theatre?—I think the safety of an underground theatre is quite as great as of one above ground, if not a little more.

1774. You agree with Mr. Ponsonby Fane in that respect?—Yes; for the reason that persons on a higher level would be nearer the street, and those on the lower level would have to go up stairs rather than down stairs.

1775. Can any theatre be opened in London without the license of the Lord Chamberlain?

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Chamberlain?—Not on this side of the water; the Lord Chamberlain's authority does not extend to the other side of the water.

1776. *Chairman.*] Are you quite certain of that?—I would add that the borough of Chelsea is not included in the Lord Chamberlain's jurisdiction certainly. The Court Theatre is not within the Lord Chamberlain's jurisdiction.

1777. Mr. *Forsyth.*] But taking London; with the exception of Chelsea and the other side of the water, no theatre can be opened except with the authority of the Lord Chamberlain?—None.

1778-9. And in other cases they require a licence from the magistrates?—Yes; in other cases they require the licence of the magistrates.

1780. Mr. *Kinnaird.*] I think I gathered from your evidence that you do not think the Metropolitan Board of Works is the best body for this matter of inspection?—I should prefer a body specially for that particular purpose to extend to the whole country. That is the tendency of my evidence.

1781. You are giving evidence, not confining it to the metropolis, but with a view to the whole country?—In the matter of inspection only.

1782. Are there not particular advantages in the constitution of that Board which would render it capable of extending its functions if necessary?—Yes; I do not say "if necessary." The inspectors may be under the control of the Metropolitan Board of Works if necessary, but it could hardly extend to the whole country then.

1783. But seeing that the fire brigade is so intimately connected with, and is indeed under, the Metropolitan Board of Works, would not that enable them to make use of that very effective machinery, and Captain Shaw's extremely valuable services, which no other body could have, for the inspection of theatres?—I think I should be inclined to place that, as I say, under a qualified inspector, who should be a skilled architect.

1784. You would not consider Mr. Vulliamy a skilled architect?—Yes, I would; but I understood you were referring to the Metropolitan Fire Brigade.

1785. I meant that in addition to an experienced man you would have all the staff of Captain Shaw to report upon the matter?—That would be a great advantage no doubt.

1786. Mr. *Ritchie.*] Of course the power of preventing a gentleman from getting a licence for a theatre after having been built, or after he had laid out a great deal of money, is a very important power to place in the hands of one particular person?—It is; but I think the authority should be given before the money is laid out.

1787. But even then the position of the architect, who is either to assent to or put his veto on a theatre, is a very important one?—A very important one indeed.

1788. Do you not think that whoever is charged with such a duty, if he be charged, there should be some power of appeal against the veto of that one particular officer?—I think there should.

1789. Would not that be obtained from the Metropolitan Board of Works?—Certainly it might in London.

1790. Do not you think that it would be an advantage to have ready at hand a Board with a superintendent architect at its head to whom a dispute would lie, in case of a dispute with one of the surveyors?—That would be so in the case of the metropolis.

1791. Therefore, in the case of the metropolis you see no difficulty in this duty being entrusted to the Metropolitan Board of Works, and by them being deputed first to the district surveyor, and on appeal to their own head architect?—I would rather not have that.

1792. Why?—I would rather have specially qualified inspectors for that duty only, and for nothing else.

1793. Then you would rather have architects whose special knowledge was more in the way of building theatres?—Yes, who specially gave up their time to that, and that only.

1794. Then your choice would be very much restricted, would it not; there are

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are not many architects who are known as architects specially for theatres, are there?—My idea is that if an architect was specially appointed for that purpose he would make himself specially acquainted with that branch of the subject.

1795. Could not the district surveyors make themselves specially qualified?—That would do away with the view I take, that these inspectors should be kept entirely free from private practice.

1796. Would not a good many of the objections which you have to other than a Government officer having these matters in his hands be done away with, by the fact of having an appeal in the case of difference of opinion?—I think if the conditions of safety for a building were laid down there would be very seldom any necessity for an appeal from the inspector's judgment.

1797. Does not that to some extent do away with your own argument, because you say you would have specially qualified men. Now you say if you had certain regulations laid down you would not require special knowledge?—My evidence was that these inspectors should have a uniform code of rules to work upon, and persons making plans would lay down their plans upon the specified code of rules.

1798. But what I understand you to say, is that those rules being laid down, it makes the inspection a simple matter?—It gives a definite object to an inspector in going through the plans or the building.

1799. But you stated that if those plans were laid down there would not be much room for an appeal?—I did say so.

1800. Then it follows that the rules having been once laid down, the inspection is comparatively a simple affair?—The inspection is comparatively a simple affair to a properly qualified man, after a certain time.

1801. Then I take it that your objection to the employment of the district surveyors does not lie so much upon the question of competency as upon perhaps some influences which might be brought to bear?—It is that.

1802. Are you aware whether other Government surveyors do carry on their own private practice at present. Is not there Mr. Henry Hunt who does carry on a private practice?—Mr. Henry Hunt does, I believe, carry on a private business; that is to say, he takes out quantities, and so on.

1803. Of course it would add enormously to the expense of this department if the officers were not allowed to carry on their private practice?—It would do so.

1804. Still I take it, that while you are of opinion that the thing can be better done by a Government Department, you still think that short of a Government Department the Metropolitan Board of Works might be employed in the way which has been suggested?—Short of a Government Department, I still think the present system is as good as any, of one inspector appointed by the Lord Chamberlain himself.

1805. You think that better than the other?—Yes.

1806. But the complaint is that the Lord Chamberlain has no staff at present, and if the music halls were added to his responsibilities it would make that so much worse, would it not?—Then he must have a staff.

1807. Then that resolves itself into what you originally suggested?—Yes, almost into what I originally suggested.

1808. The honourable Baronet on my right asked you some questions with reference to the mode in which these places were licensed, and what influenced the minds of those who licensed theatres; I will ask you one question upon that; do you know any theatre which has been licensed as a theatre, after having been refused a license as a music hall?—I mentioned one case of my own knowledge.

1809. You spoke of naked lights, as I understand, being on the ground line?—On the ground floor; they are called "ground rows;" that is the technical term.

1810. Are they upon the ground?—They are upon the ground.

1811. Have you ever seen any naked lights hooked on to the machinery?—Yes, precisely the same lights which are spread on the ground are also hooked on occasionally behind the wings.

1812. Do not you think that is attended with considerable danger?—Whenever that is done there are always persons by specially to attend to them.

1813. But in any case they are always fraught with danger?—Yes.

1814. Is there anything in the construction of those lights which would render

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it impossible to put wire gauze round them?—No, it would not be impossible, but it is from the fact that they are temporary that the wire gauze is not put up round them.

1815. Whenever a fire does take place it is generally from the machinery coming in contact with those naked lights, is it not?—Generally the hanging parts come in contact with the lights.

1816. *Chairman.*] You were asked with respect to the precautions, in your opinion, removing the responsibility from the managers; what you suggest would only place the managers in somewhat the same position as the directors of railways, which are inspected by officials before the construction of the line, but the responsibility is in no way taken from them?—That is entirely my view.

1817. You do not wish in the least to say that the responsibility of the managers should be diminished by the appointment of inspectors?—Not in the slightest degree.

1818. But simply that the staff of officials appointed by the Government should certify with reference to the construction before a licence from another Government body should issue?—Yes.

1819. Leaving anything which occurred in consequence of the non-observance of the regulations laid down, entirely with the manager?—Entirely.

Mr. *John Fish Pownall,* called in; and Examined.

Mr. *J. F. Pownall.*

1820. *Chairman.*] You are one of the Bench of Middlesex magistrates, are you not?—I am, and have been so for about 30 years.

1821. As such you have of course had to deal with the annual licensing of music halls in the metropolis?—I have.

1822. And from your experience can you state to the Committee what requirements are made by the magistrates before they issue such licences?—We have no opportunity, except a personal inspection and inquiry at the time as to the size and suitability of the rooms. We have no other inspection than that, or any report upon the architectural construction.

1823. But in issuing a licence you do not think it necessary, do you, to atisfy yourselves with reference to the places and their construction in which these entertainments are to be given?—We merely take care that notices of the intention to apply shall be very freely distributed, and expect that if there is any objection, either on the part of the parish authorities or on the part of the police, it will be reported to the magistrates. Our standing orders require that a notice be fixed upon the outer door or other conspicuous part of the premises sought to be licensed, and on the outer part of the police station or other lock-up of the parish. That notice shall be served upon the churchwardens and overseers, and the clerk to the vestry or to the guardians, and that notice shall be given to the clerk of the peace and to the clerk of the petty sessional division.

1824. All those notices and regulations under your standing orders seem to point more to giving the public notice in case they object to it on grounds of its being unnecessary, or a place which they do not want established in their midst?—No doubt that is so.

1825. Are the public so likely, do you imagine, to consider the question of the construction of such a place, and the security to the public from fire, as they would be merely to entertain the question of whether such a place is necessary or not for their amusement?—I think not. We have no architectural survey of it.

1826. And in fact, in your view, the evidence which comes before the magistrates on these occasions is deficient to the extent that you have nothing to guide you with regard to the construction of places applying for a licence?—We have nothing but our personal inspection, and the inspection of those magistrates who have been upon the premises.

1827. Is it the rule invariably to view the premises before granting licences?—It is certainly not the invariable rule, but I think it is pretty generally done before any new licence is granted.

1828. I suppose

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1828. I suppose at the same time there is a certain amount of danger in that, and in your opinion you think that it would be of advantage to the public that there should be some regular inspection with regard to the construction of the places before a license is issued?—I think it might be of advantage that as a general rule no person should apply without having a certificate of the fitness of the building for the purpose.

1829. That on applying for a licence to the magistrates a person should produce, as one of the necessary documents, a certificate of inspection with reference to construction?—That is my meaning.

1830 Have you thought at all to whom you would entrust the power of such inspection for constructing purposes?—I have not formed any idea upon that point.

1831. You have heard the evidence which has been given before the Committee to-day?—Yes, I have.

1832. Having heard that evidence, do you think that it would be necessary to appoint a separate department having entire charge of such construction, or would it be sufficient to entrust the Metropolitan Board of Works or other local authority with those conditions, and that they should see that they were properly carried out before the licence was applied for?—The inspection would be so extremely trifling in 19 cases out of 20 of the licences granted by those magistrates, that it certainly would not be worth while to have any special authority for that purpose, because a large proportion of the licences applied for are merely to enable a public-house to have music, perhaps for a club meeting sometimes, or for a public dinner occasionally, or matters of that nature; a very small proportion are for anything but music, and merely that they may not come under any penalties if they happen to have music on such occasions.

1833. At the same time, I suppose you would admit that wherever a number of people are brought together as they may be where music and dancing are the inducements held out, it would be desirable that the authority who licensed should satisfy themselves that the places in which these entertainments were to be carried on were properly constructed, with proper means of egress in case of fire?—Where there was music and dancing in the metropolis, I think it would be. But for a place, such for example, as the "Abercorn Arms" at Stanmore, which is a large hotel, which has perhaps two balls a year, and which is licensed for music and dancing; I can hardly consider it is necessary to have a Government inspector for that, and the number is so small comparatively of music and dancing licences that I think a distinction should be made between those places which are licensed for only music and those which are licensed for both music and dancing.

1834. But surely a place of that sort which is only occasionally used in that way is more likely to produce danger to the public than one that is generally in use, is it not?—I think not.

1835. You say that this relates to so many of the licences you grant, but at the same time a music and dancing licence is the same to all, whether it is for music or for a ball, or for a few people assembling for singing at a public-house?—No; the licences are not all is for music and dancing or for other public entertainment; some are granted for music only, and others for music and dancing.

1836. What I meant by my question was, that although in many instances a music and dancing licence would hardly justify inspection, there may be cases in which a large concert is given and where a large number of people are brought together, and where you ought to have the same security with regard to fire as you have in a theatre or other place?—Certainly.

1837. Therefore, as there is no distinction between the issuing of your licence in those two cases, would it not be necessary that a proper certificate should be brought before the magistrates in every instance, covering in that way places in which a large number might be assembled?—I think before a certificate was made compulsory some classification might be made of the kind of building to which the licence was to be granted. I cannot think that such an inspection would be necessary for the number of cases of small public-houses where the assembly would never come to more than 20 or 30 people.

1838. That implies something else; it implies really a separation of licences, and the creation of a fresh licence which would apply to a large entertainment

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separate from those, only for a certain number of people?—I think that if any line could be drawn it would be advisable, but I confess I have been utterly unable myself to devise any line, or to find anyone who could suggest one.

1839. Therefore what I would like to ask you upon that is, that as you seem to think it would be impossible to draw a line, is it not in your judgment necessary that a certificate should in every instance be required, so as to cover those places where the possibility of danger to the public must exist?—Perhaps so; but it would necessarily have the effect (which might be a good effect) of shutting up a very large number of them.

1840. How would that be the case?—Because many of them are public-houses of such a character in the dense parts of London, that they could not, I think, without reconstruction, be made to conform to any rules which could be laid down as general rules.

1841. Supposing one of these rules to be, that where a house proposed to ask for a licence for only a certain number of people, the certificate of construction should invariably apply, but that below that number the certificate of construction would not be necessary, would not that meet the difficulty; that is to say, supposing a certificate is required in all instances, if the applicant could show upon his certificate to the architect that his application for a licence was only for music, with a certain number of audience, then the architect or inspector should make it a part of his certificate that he only applied for that, and that therefore the question of construction had not been gone into?—That might be sufficient, but I should not like to give a decided opinion off-hand upon that point.

1842. Do you think if a certificate of construction were required in general, even with a certain mode of getting out of it, as I have suggested, that the Metropolitan Board of Works, and the district surveyors employed by them, would be the proper authorities to deal with such construction, and to give such certificate, or would you suggest, as the last witness did, that a certain independent official should be appointed, to whom the matter should be entrusted?—I have not sufficient architectural knowledge to give an opinion upon that, but I should have thought that the district surveyors appointed by the Metropolitan Board of Works could perfectly well carry out such an inspection.

1843. The Metropolitan Board of Works surveyor at the present time inspects under the Building Act?—No, the district surveyors independent of the staff of the Metropolitan Board of Works itself. They can hardly be called the staff of the Metropolitan Board of Works, because the Metropolitan Board of Works has a separate staff from the district surveyors.

1844. You would allow of an appeal to the Metropolitan Board of Works from the district surveyors, therefore you would have first the certificate of the district surveyor with reference to construction; his certificate would be acted upon unless appealed against, and then the appeal would be to the Metropolitan Board of Works, and unless that appeal were taken, then the magistrates would issue the licence upon that certificate?—I should think that would be perfectly satisfactory.

1845. Do you think that the present regulations and the mode of enforcing them are satisfactory with regard to theatres?—I am unable to give any answer on that point. With regard to music halls, there is, in fact, nobody but the police to enforce any regulations, and even they hardly interfere unless it is a case of public disturbance, because the music-hall keeper being liable to a *qui tam* action for any breach of his licence, the police consider they have very much less to do with it than if the proceedings were not by information for penalties, and the magistrates have no power to make any conditions or to do anything except give or refuse the licence; they cannot attach any conditions or in any way inflict any penalties, but they can merely grant, or renew, or refuse to renew a licence.

1846. I wish to ask you upon that, do you think it might be well that instead of having merely that one power of taking away a licence, there should be penalties which you could enforce at law; that is to say, minor penalties than the taking away of a licence, which often is far too severe, by which you could enforce the law in case of a breach of regulations, such as filling up the corridor or

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or the gangways with chairs?—I think that ought not to be a matter for the magistrates, but a matter of police regulation.

1847. What I mean is this: that supposing you made these police penalties for the breach of certain regulations, the magistrates would then, on granting a licence, be able to lay down the regulations under which this licence was granted, and you could enforce those regulations by small penalties, whereas at present your only means of dealing with the manager is by taking away his licence?—The enforcement of penalties, and the evidence in support of them, would be entirely a matter of police. I think regulations might certainly be framed by the Quarter Sessions, but the penalties which they could lay down could hardly be severe enough to make the proprietor care much for them. I think that suspending the licence for a month, or something in that way, or making conditions which if he broke would render him liable to lose his licence, would be more efficacious. At present the magistrates can make no conditions or regulations whatever, and if the holder of a licence transfers that licence, and the transferee breaks the orders mentioned on the grant of the licence or the *quasi* conditions on which the licence was granted, on the licensing day he pleads that he was perfectly ignorant of anything of the kind, and it therefore becomes a very hard case. But if the magistrates could append conditions to their licence, I think that would be sufficient without the penalties, because I believe the penalties have very little effect, any more than they have in the intoxicating liquor licences. I believe the penalties there have the slightest possible effect.

1848. At the same time, suppose a manager had been convicted in penalties for breaches of rules which had been attached to his licence on several occasions, there would be greater justification in the magistrates taking away his licence when he applied for a renewal than there would be at present?—I think so; but I think if without penalties two or three breaches were proved of the conditions, that would be sufficient.

1849. Would it not be sufficient if they were taken as breaches into a court, and penalties inflicted?—Yes; possibly there might be an advantage in that.

1850. And you would have a record of the case which had been fairly tried upon its merits, and which would therefore justify the magistrates in saying, You have infringed the conditions, and therefore we suspend or take away your licence?—Certainly.

1851. But as I understand you, although there are some theatres outside the Lord Chamberlain's authority, from your own experience you do not speak of them, but only as to music halls?—I merely speak with regard to those that come before the Quarter Sessions; any theatre outside the Lord Chamberlain's authority would not come before the Quarter Sessions, but only before the Special Sessions of the Division.

1852. Each division would deal with its own licences?—Yes, each division would deal with its own licences, and as I have never sat in Chelsea I know nothing of the matter.

1853. Are you aware in a case in which the magistrates refused a licence for a music hall, as has been stated by the last witness, the Lord Chamberlain has issued one for a theatre?—I believe that was the case of the Alhambra some years ago. On account of the gross indecency of one of the dances there the magistrates refused to renew the licence. An application was then made to the Lord Chamberlain, and a licence was then granted for it as a theatre.

1854. On his being satisfied with it as regarded the plan?—I do not know anything of the reasons which governed the decision.

1855. Did you have anything put before you with regard to the construction of the place?—No, not at all. It was purely on the evidence that we had with regard to the character of the dances performed.

1856. Then your experience is that the magistrates never have before them, as a matter of consideration in granting a licence, this question of the construction of a place with regard to the safety of the public from fire?—Except perhaps some question asked by an individual member.

1857. But not satisfactorily in an official manner, as you think one ought to have to be satisfied that no danger exists?—Certainly; not in any official manner.

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1858. Is there anything else which you would wish to suggest to the Committee?—No.

1859. Mr. *Claifton.*] I think the case of the Gaiety Theatre came before you, did it not?—Yes; it was in the special sessional division, of which I am chairman, and the circumstances of it were that it had been formerly a licensed music hall, and had held a licence for music only; they had dancing there, upon which we refused to renew the spirit licence, and they continued then to use it merely under their music licence, until the following October, when the music licence was not renewed. It remained closed for a considerable time, and then it was taken up by other persons and converted into the Gaiety Theatre. They wished to have the restaurant licensed for the sale of spirits, and we found that under the Licensing Act of 1872 we were unable to grant a licence to the restaurant if it had any internal communication with an unlicensed building as a theatre would be; therefore it was impossible under the Act of 1872 to grant a spirit licence until that internal communication with the theatre was closed. I was in communication with the manager in order to see if that closing would be an inconvenience to the public, because I desired if it was an inconvenience to the public that it should be avoided, but the clause seemed too strong for any mode of evading it, and, therefore, we were obliged to require that door to be closed. When application was made to the Lord Chamberlain he also required that the theatre should be internally divided from the restaurant, and those, I believe, were the small structural variations which were referred to by the last witness with regard to the Gaiety before it was licensed as a theatre.

1860. Sir *Henry Peek.*] Those licences are renewed annually, I believe?—At the October sessions.

1861. There might be very good moral reasons why you should refuse a licence for music and dancing?—Those are the grounds upon which I may almost say that any license which is refused is refused, unless it is that it is unnecessary, or that there is some breach of good morals upon the part of the performance.

1862. If I understand the matter aright the proprietor of an establishment of this sort, which has been closed by the magistrates, can go, and in point of fact instances have been known in which he has gone, to the Lord Chamberlain, and get the license which the magistrates had refused him?—Not exactly the same license that the magistrates have refused. At the Alhambra they had a license for music and dancing, and the Lord Chamberlain granted one for theatrical entertainments.

1863. The Committee have been told that some of these music halls have dramatic representations?—No; no music hall has a theatrical representation; they cannot have that; it comes very nearly to it, because some of the songs are very often sung in character. The line is extremely fine between the two, but no theatrical representation is allowed at a music hall.

1864. In point of fact, it is a distinction without a difference?—No, there is a difference; the courts have laid down very fine points as to when it is to be considered a theatrical entertainment, or when it is to be considered only music.

1865. Do you know anything of the Variety Theatre in Hoxton?—No; I do not remember that case. I think I cannot have been present upon that occasion, but I should think it is exceedingly likely that it may have come under the same point that I was speaking of with regard to the Gaiety, the Act of 1872 requiring that there should be no communication between a licensed public-house and a place not licensed.

1866. I suppose that some of these music halls which you license hold a great number of people?—A large number.

1867. What would you say some of them would hold?—Some hold thousands.

1868. And whether they have one means of exit, or two or three or four, is a matter which the magistrates do not inquire into?—Only accidentally; we have no formal requirements on the subject.

1869. I believe that in music halls smoking and drinking are allowed?—That is entirely according to the wish of the proprietor.

1870. But

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1870. But they are not allowed in a theatre?—I do not know what the regulations of the Lord Chamberlain are, but every person holding a theatre can sell intoxicating liquors within the theatre.

1871. Mr. *Onslow.*] Do I understand you to say that you think the penalties would not be effective, because, from your experience, penalties under the present Licensing Act as regards the sale of liquor are ineffective?—Certainly; I consider that the penalties are so trifling in comparison with the value of the licence, that it is purely the value of the licence which keeps public-houses well conducted, because a penalty of 5 *l.* or 10 *l.* is nothing to a man whose licence is worth 7,000 *l.* or 10,000 *l.* to him.

1872. *Chairman.*] At the same time there is a record of the conviction?—Quite so. I was merely speaking of the amount of the penalty.

1873. Mr. *Onslow.*] You, as a magistrate, say that the amount of penalty at the present time is not a deterrent?—I think not. I think it is the conviction itself, not the amount of the penalty, which is a deterrent, and the effect it may have upon the re-grant of the licence. I am speaking, of course, of the metropolitan houses, where the value of the licences is so enormous as it is in most cases.

1874. Could not you, under your existing powers, require a certificate from every proprietor of a music hall from some surveyor to state that the music hall is safe from fire?—I suppose we might make a standing order to that effect, just in the same way as requiring the notices.

1875. At present you have no standing order to that effect?—Certainly not.

1876. Would it not be advisable to have some such standing order. We are told by Mr. Robinson, in answer to the question, "Speaking generally, do you think music halls in London at the present time are sufficiently protected in case of fire? *A.* I think not; they are nothing near so well protected as the theatres are"?—It is difficult to speak of music halls as distinct from the large number which are not really music halls, but merely public-houses with music in the parlour.

1877. Mr. Robinson was asked another question: "May I take it that it is your opinion that as a rule the construction of music halls is totally inefficient in case of a fire breaking out for the protection of the public?" To which he replied, "Yes, I do think so." Now, considering that in the mind of a very experienced man that is the state of the music halls at the present time, do not you think it advisable that the bench of magistrates should frame such regulations as should require the proprietors to produce some security, and that immediately. We have it in evidence that there is not one music hall in London safe?—Opinions so entirely differ as to what makes a music hall safe, that unless we had some outside referee to decide upon the matter, it would be almost impossible for the magistrates themselves to enter upon that question completely.

1878. Would not the certificate of some surveyor be sufficient?—As I have before said, I think that in by far the larger number of cases it would be almost impossible, because there are probably some public-houses with little wooden staircases, and perhaps only 20 or 30 persons meeting there. As to the large music halls I can quite see that it might be advisable, but I do not myself see the possibility of well framing a difference even as to the numbers. I think there is very great difficulty in drawing a line.

1879. Are you aware of any music hall, or contemplated music hall, which having been refused a licence by the magistrates has been turned into a theatre?—The Gaiety was a music hall, of which we refused to renew the licence, and after a considerable lapse of time it was turned into a theatre, but it was reconstructed in the meantime. I do not know whether that was the point you meant, or whether it was with regard to the construction.

1880. I meant with regard to construction?—I do not know of any case which turned on the construction.

1881. Mr. *Ritchie.*] With regard to your making a standing order that the proprietor of a music hall should produce a certificate from an architect, the value of a certificate from an architect would depend greatly upon the independent position of the architect, would it not?—Quite so.

1882. Therefore a certificate which a man brought up from an architect

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of his choosing would have very little value?—It would be absolutely worthless.

1883. Therefore you would have a right to make objection to such a certificate? -- I thought the honourable Member referred to the district surveyors.

1884. I wished to ask you one other question, and that is with regard to these fines; every time a man comes forward for the renewal of his licence the question of any conviction is gone into, is it not, before the licence is renewed?—If the police report it.

1885. Is there not also some means by which a report of that kind is assured to the bench?—In London the bench have no control over the police, and it not unfrequently happens that the police do not report things to them.

1886. In every case the fine is not so much material for itself, but with reference to the bearing it may have upon the renewal of the licence?—We remark as to the fact of the conviction, and its being seen to be a conviction for a considerable part of the maximum fine which can be imposed. If, for example, a fine of 5 *l.* could be imposed, and a fine of 5 *s.* only is imposed, that would count very much less than if it had been an offence for which the penalty of 5 *l.* could be imposed and the full penalty had been imposed.

1887. But where the fact of a conviction is known, is it not the usual practice that the evidence of it is heard before the magistrates with respect to the renewal?—Generally, but unfortunately it not unfrequently happens that the inspector does not bring up with him any of the police constables who know anything about it, and we are unable therefore to obtain direct evidence upon the subject, and of course it is not fair to go into the matter merely from the second-hand evidence of the inspector.

1888. *Chairman.*] Could not you, the magistrates, adjourn a case, in order that that evidence should be laid before you?—It does not follow that the police will choose to bring it before us.

1889. Mr. *Ritchie.*] As a matter of fact is it not invariably the case where the renewal of a licence is applied for, and there is any conviction, that the granting of the licence is postponed?—Unless it appears so trifling that it does not appear worth while to do so. If the offence was merely being a few minutes late or something of that sort, and the licensed victualler had only been made to pay costs, then it would not be postponed; but if it was anything which looked at all serious, it would be postponed at once to the adjourned day.

1890. And in that case I suppose the magistrates would take care that proper evidence would be forthcoming, or directions would be given that it should be forthcoming?—We are in the hands of the police.

1891. Sir *William Fraser.*] Can you mention any case where the magistrates have suppressed a theatre, or a music hall, or place of amusement, in consequence of their being inadequate protection to the public in case of fire or panic?—Certainly not.

1892. You do not know one case?—I believe no such case has occurred, at least for a number of years.

1893. Would you not consider, speaking generally as a practical man, that in cases of fire, or alarm of fire, the safety of the public requires at least three or four more means of exits than would be required in going out quietly in the ordinary state of things?—I really cannot form an opinion upon that point; for myself I cannot believe that anyone can form a judgment of what might happen in a case of panic; it depends entirely upon the violence of the panic, and I have no idea of what could be done in such a case.

1894. There is only one more question which I wish to ask you to clear up the case upon the evidence which you have given. I think I understand you to say that the Gaiety Theatre was one, the licence of which was refused as a music hall by the magistrates, and that it was subsequently licensed as a theatre by the Lord Chamberlain?—After having been closed for some time and reconstructed.

1895. The Gaiety was practically rebuilt, I believe, before the Lord Chamberlain licensed it as a theatre?—I do not know how much of it was rebuilt, but I know there was a great deal done to it; but our refusal had nothing to do with the construction.

1896. What I wanted to clear up was this: the inference to be drawn from your

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your answer was that, on the licence being refused as a music hall by the magistrates, it had been licensed as a theatre by the Lord Chamberlain; but that was not, as I understand, the case?—No, the licence was refused by us on account of it contravening the licence, because they had dancing there when they were only licensed for music.

1897. Mr. *Young.*] Do you happen to remember of recent years whether any of these music halls, or public-houses where they have had music in the parlour, as you put it, have been burnt, or accidents have happened from structural malformation?—I do not remember any such case.

1898. Do you remember the case of a music hall being burnt?—The Oxford Music Hall was burnt some years ago, and I believe no accident occurred then; but I cannot speak with any certainty upon that point.

Mr. *John Hare,* called in; and Examined.

Mr. *J. Hare.*

1899. *Chairman.*] I BELIEVE you are Proprietor of the Court Theatre?—I am.

1900. That theatre is licensed by the Chelsea magistrates, and is not under the Lord Chamberlain?—It is licensed by the Chelsea magistrates.

1901. Can you tell the Committee whether any requirements were made by the magistrates at the time of the licence with regard to the construction of the theatre, or any inspection made?—No, not until the fire at the Brooklyn Theatre took place.

1902. When you first applied for a licence there was no inspection?—No.

1903. Will you tell the Committee what inspection took place subsequent to the Brooklyn fire, having called attention to the desirability of it?—The Chairman of the Chelsea magistrates and the surveyor of the district inspected the theatre, and made certain suggestions for alterations which they thought would be necessary, and which I have carried into execution; and subsequently to that the Chairman came, at my request, and inspected them for himself, to see that they were properly carried out, and the magistrates afterwards renewed the licence.

1904. The inspection and those suggestions occurred previously to the last renewal of the licence?—Yes.

1905. I do not know whether you are aware of the evidence which has been given before this Committee in favour of all the theatres and music halls in London being placed under some authority, who should certify as to the construction of them; do you see any objection to such a course?—No; I think it would be most desirable in every way.

1906. I suppose it would enable the managers to know the exact conditions on which their theatres would, as a matter of course, obtain a licence, and would save the possibility of ill-considered suggestions arising out of a panic?—Certainly.

1907. Would you see any objection to what followed that suggestion on the part of Mr. Ponsonby Fane, that regulations such as are laid down by the Lord Chamberlain's office now, or which might be then laid down by the newly created authority, should be able to be enforced by penalties, so as to be able to do away with the necessity of taking away the licence as the only punishment?—I quite agree with Mr. Ponsonby Fane's suggestion.

1908. That that would be a fair way of protecting the public, and prevent the injustice of closing the theatre for a trivial offence?—I think so, certainly.

1909. Can you state to the Committee the exits which there are from the Court Theatre?—I made a memorandum of them; there are seven separate exits from the theatre.

1910. Are those exits available on all occasions, or are some of them exits which are only used in case of emergency?—They can be used; they are all always open to the public, but they are not all of them used as a means of entrance but as a means of exit, and I have directed the attention of the public to them by a statement on the programme.

1911. You have pointed out on the programme the doors which are available in case of fire?—Yes.

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1912. And those are more than the ordinary doors by which they reach their carriages?—Yes.

1913. Are those doors available as separate exits for different parts of the audience, or can the audience all avail themselves generally of those doors; that is to say, if they were all available they might get blocked by one set of audience whilst the other was without the means of egress?—They are not all available by the mass of the audience. There are three separate entrances and means of exit from the ground-floor of the theatre. That includes the pit and stalls.

1914. Those are distinct from the outlets of the other parts of the house?—Yes, perfectly.

1915. So that whilst there are available outlets for each part of the house, there is no chance of their being blocked by a sudden rush to any one of them?—No, not at all.

1916. In the construction of the theatre was the width of the passages considered?—I think not.

1917. Do you think that is an important consideration for the safety of the people in the theatre?—I think so; I think it entirely depends on the way in which a theatre is built. Whether the outer wall of a theatre is near a street or not. In some theatres you have to go down a sort of tunnel to get into them at all, and in those cases the width of the passages is of very great importance, much more so than if there is very little width between the outer wall and the auditorium.

1918. If the exit is almost immediate, that difficulty does not arise, but if a long passage has to be traversed a panic might produce a crush, which is the danger?—Certainly.

1919. I suppose you would agree with the other witnesses, that the danger arises more from the fear than from the fire itself?—Yes.

1920. And that sufficient exits in different parts are more serviceable than a great number of exits?—Quite so.

1921. I suppose the managers of theatres, from your knowledge, are always willing to adopt any suggestions which are made to them by the Lord Chamberlain's office or by the magistrates?—They are most anxious to do so.

1922. Their responsibilities are very great, and they are anxious to protect the public?—Quite so.

1923. You see no objection to any suggestion which would make the construction of future theatres depend upon a certificate of particular construction and regulations, which could be enforced for the maintenance of that construction and those regulations?—I think it is most important and most desirable that it should be so.

1924. Would you, as the manager of a theatre, have any objection to that authority inspecting your theatre generally, whenever he wanted to do so?—Not at all.

1925. At present the inspection, as I understood Mr. Ponsonby Fane to say, takes place in his case, and I suppose in the case of the magistrates, before the licensing day comes on; but would the proprietors, do you think, object to the inspection being at any time when the authority chose to see that the regulations then laid down were carried out?—Certainly not.

1926. In fact the managers will work heartily with any authority in carrying out regulations for the protection of the public?—Certainly.

1927. Is there anything more which you would like to place before the Committee with regard to the question which has been submitted to them?—No, I think not.

1928. Mr. *Ritchie.*] Your theatre is not under the Lord Chamberlain?—No, it is not.

1929. Are you furnished with a copy of the Lord Chamberlain's regulations to the other theatres?—Yes.

1930. Do the Middlesex magistrates at all insist upon your compliance with those regulations?—Yes.

1931. They are furnished to you by them as their regulations?—Yes.

1932. Of course I presume you endeavour to carry them out?—Certainly.

1933. Do your doors open outwards?—Yes.

1934. You have two exits from the dress circle, one at each corner, and only one is used at night?—I think they are both used.

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1935. It is not used as an entrance, is it?—Only one is used as an entrance.

1936. The other door is left open, but the passage is blocked with chairs?—No, there are no chairs blocking it.

1937. Have you water on from the mains?—Yes, on each side of the stage.

1938. Is the water at high pressure?—Yes.

1939. And reaches to the top of your theatre?—Yes.

1940. Have you any persons specially to see as to the arrangements and precautions to be taken against fire?—We have a fireman constantly there.

1941. Has he had any training as a fireman?—Yes, he has qualified in the brigade.

1942. Was he one of Captain Shaw's men?—Yes, he was one of Captain Shaw's men.

1943. I suppose all the flies are supplied with hatchets and things of that kind for cutting down scenery?—Yes.

1944. Have you had any fire at all?—Never.

1945. Do you use any naked lights which hang on to the scenes?—We do.

1946. Do you see any objection to those being covered with wire gauze?—I do not think it would be any use their being covered; if they were covered with any amount of wire that would cast a shadow upon the scenery; as it is they are hung up above the head of anybody walking underneath, and there is a man whose duty it is to attend to each one of those lights until the scene is over. I am not at all sure that there might not be means by which they might be masked, but I have thought a great deal of it. I cannot see how that could be done without damaging the effect of the scene; they are the only unmasked lights in the theatre.

1947. Do you keep any portion of your properties underneath the stage?—Some portion.

1948. Do you think that is a necessity, because it appears to me to add a great deal to the possibility of danger?—It is almost impossible as my theatre is constructed to do anything else; that is to say, the properties in use in the piece in performance are kept there; nothing else is kept there, everything else is sent away.

1949. I have seen theatres where the space underneath the stage is used as lumber-rooms?—That is not the case in my theatre.

1950. Have you thought whether an iron curtain shutting off the stage from the auditorium would be desirable?—I have thought about the matter, but I hardly feel in a position to say whether it would be a safety or not. I very much doubt it. I think any theatre with entrances properly arranged can be emptied considerably under five minutes, because allowance always ought to be made for this; a morning performance in a theatre is the best proof that the people can get out of a theatre in about a third of the time they can when they are waiting for their carriages; people then wait about in the lobbies, and it always seems to them as if there were a great deal of danger which there is not, because they could immediately get away if they chose.

1951. Mr. *Onslow.*] We have had in evidence that a great deal of danger arises from properties being on the top of the ceiling over the auditorium; are you aware of any newly constructed theatre where such is the case?—I do not know whether there is a room for that purpose there.

1952. Your workshops are not there?—No, they are not.

1953. I would ask you if it is not possible that you could have an effectual inspection by some properly constituted authority during the time of the performance; I mean by that when the gas is burning, and when the theatre is full?—I do not see at all why there should not be some such inspection made.

1954. You think there would be no inconvenience arising from that?—No, I think not.

1955. Are you of opinion that that would be for the protection of the public a better inspection than by day?—As regards the arrangements on the stage, which would be where the danger is supposed chiefly to arise from, I may mention that my feeling upon the subject is this, that if that were done by some officer from the fire brigade, a superior officer who from time to time came, as it were, to overlook his own men who were there, I think it would be a very great advantage to the theatre; it would be a very great nuisance to have an architect coming pottering about behind the scenes, because it is in the gas department

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that the danger really arises, and to see that the man there is properly attending to his duties is a thing which the manager ought to attend to.

1956. You have no objection to such an inspector coming at any time during the performance without giving notice of any sort or kind?—No, certainly not.

1957. You have said that you have a fire brigade man always on duty at your theatre?—Yes.

1958. Is that always the case?—Yes, at every theatre in London.

1959. Do you think that it is possible by any means to render incombustible the material used for scenery?—I believe that it is possible by this process of soda, of which Mr. Henderson, who, I believe, is going to be examined after me, knows more than I do. I believe he uses it in the Criterion and Folly Theatres, but the inflammable nature of scenery is very much overrated; it is very difficult for a piece of scenery to catch fire. The size and material used in preparing the canvas for painting renders it very difficult to catch fire in simply passing across a light.

1960. In your theatre, have you a brick wall extending from cellar to roof, dividing the auditorium from the stage?—Yes, I think we have. I am not quite sure, but I am sure that it is brickwork.

1961. Sir *Henry Peek.*] Mr. Ponsonby Fane told the Committee that he made it his business regularly himself to inspect theatres under the Lord Chamberlain; do the magistrates who licensed you make it their regular business to inspect you periodically?—They had not done so until the fire at the Brooklyn Theatre. I have only been manager of the theatre for such a very short time; only for two years. The Court Theatre was not inspected when I took it from the previous manager, but after the Brooklyn fire the theatre was inspected, and certain alterations were made at their request.

1962. It is only fair to suppose that but for the Brooklyn fire you would never have been inspected at all?—I cannot tell, because I have not been in the theatre very long to be able to say whether the justices were in the habit of inspecting before that time.

1963. Mr. *Clifton.*] You do not allow chairs in your gangways?—We do not.

1964. Do you see any objection to making it a matter of police regulation in case of chairs being put in the gangways?—Not at all.

1965. Sir *James M'Garel Hogg.*] With regard to the fireman you have referred to, is he one of the retired firemen; one who was under Captain Shaw?—He retired from the brigade when he accepted an engagement in the theatre. He receives no pay from the brigade now, but from the theatre.

1966. *Chairman.*] Is he still retained on their staff?—No, he is not.

1967. Sir *James M'Garel Hogg.*] You said that you had a man stationed always by the naked lights; have you water and hydrants and things ready in case of accidents?—Yes.

1968. Sir *William Fraser.*] I wish to ask you this question: There has been this difficulty suggested, that the Lord Chamberlain's power is too great and too little; that he would hardly like to stop the licence of a theatre, and I assume that the magistrates would feel the same hesitation, supposing their regulations were not carried out; may I ask whether you have any suggestion to make as to how the power of the Lord Chamberlain or the magistrates should be carried out short of stopping the licence of a theatre, which would visit a great deal of misfortune on a great many people, because that seems to me a point which we are required to get at if we can?—I cannot really offer you any suggestion on the point.

1969. I did not catch how many doors there are to your theatre, but I would ask this: At those means of exit are men posted, and do they remain there for the purpose of opening those doors in cases of fire or panic all the time; are they posted there like sentries?—Yes, but all the doors are now made to swing open both inwards and outwards, and it is not necessary to have men stationed at them.

1970. So that the ordinary means of exit and the means of exit in the case of panic are the same, and it is not necessary to have men there because the doors open outwards?—That is so.

1971. What is the width of the passages?—About four feet I should think; the

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the passages round the dress circle are about four feet wide, but it is for a very short distance that they are so narrow as that; they get wider.

1972. I think this is a fair question to put: Do not you think that in theatres and places of amusement there would be a more effective inspection if the inspector were sent at a time when his visit was not anticipated?—Certainly I do.

1973. I have heard that the present practice is that the managers know when the inspector is coming, but, of course, it would be a better plan that the manager should not know?—Certainly.

1974. You mentioned this preparation of tungstate of soda; that I believe has been tried as regards the dresses particularly; some people say that it interferes with the colours, but I have heard that that particular preparation is very useful in preventing both dresses and scenery from catching fire?—It is.

1975. I think you agree that these chairs or seats which fall over in the passages which are not otherwise occupied are very objectionable in case of fire or flame?—Yes, that is so.

1976. Mr. *Locke.*] You say there are three exits to get out of the theatre?—There are seven.

1977. In what parts of the building are those seven openings?—There are three which would be available for the audience occupying the ground-floor of the theatre, the stalls, and the pit, but only to be used by the stalls on occasion of emergency. I have had an extra opening made from the stalls through the pit by which the occupants can get out if they choose.

1978. Then from the front into the street there is only one?—Those three exits are all into the front.

1979. Then, in point of fact, whatever part of the theatre they come from they come to the front, and they get out every one of them?—Yes, every one of them except the carriage entrance.

1980. Would not there be a great deal of difficulty in all those persons coming to one spot to come out?—No, because they do not come together until they get into the street; those six exits are perfectly distinct and some distance from each other; if there was a panic in the street there might be a crowd, but there is perfect freedom to get separately to those means of exit.

1981. But those persons coming out would be all at one spot to get out of the place?—Yes.

1982. That would be a difficulty, would it not?—I think not.

1983. With regard to the larger theatres, are there not four sides to some of them?—Yes; there are in many theatres.

1984. Therefore if there were any difficulty about getting away, it would be an advantage if they could get away in all directions, north, south, east, and west?—Yes, it would be an advantage, no doubt.

1985. Your theatre opens to the east, does it not?—It does.

1986. In the large theatres that were established years ago, had people not an opportunity, supposing there was a fire, of going out on the four sides?—On more than one, certainly.

1987. Take Drury Lane, for instance; there would be exits north, south, east, and west, and the persons who were in that theatre would be able to get out of it?—Yes, they would.

1988. Now the theatres which have been built lately are, generally speaking, all covered round, with the exception of one side?—I think they are.

1989. That arises from its being very difficult to get a space which is not covered by other houses; but, generally speaking, all new houses have only one side open?—That is so.

1990. Mr. *Young.*] I understand that when people all come out in front they are not mixed up together until they are in the street?—That is so.

1991. They are in separate passages until then?—Yes, that is the case.

1992. Those passages you spoke of are only about four feet wide?—A few of them are only about four feet wide, but they vary.

1993. Do all of them, or any of them, get wider as you get nearer the street?—They do.

1994. Mr. *Hayter.*] Have you printed regulations issued to you by the Middlesex magistrates?—Yes, a copy of the Lord Chamberlain's regulations.

1995. Your theatre is only inspected once a year, is it?—Only once a year.

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1996. And then inquiry is made with reference to whether the regulations are carried out?—Yes, that is so.

1997. Are the seven exits used every time the theatre is opened; are they perfectly known to the public?—They are perfectly known and used. The seven include the stage entrance.

1998. That is not in the front?—No, it is not.

1999. Mr. *Kinnaird.*] Where does the stage entrance go to; does that lead to the front?—No, that goes to the side, just opposite the railway station.

2000. What number, when full, does your theatre hold in round numbers?—Eight hundred and seventeen; that is the utmost capacity of the theatre.

2001. And you say, on an emergency, under five minutes would clear it?—Under five minutes.

2002. What is the ordinary time that the people get out in, in a quiet time? I should think that the theatre is cleared in from 10 to 12 minutes, including people waiting for their carriages.

2003. You consider that you have unusual facilities for emptying?—Yes, I have timed the theatre emptying in the morning when we have had the largest houses, and it has been under four minutes, that was without waiting for their carriages.

2004. *Chairman.*] What you represented to the Committee was that those exits of yours are absolute deliveries on to the street without any vestibule where people congregated, and that the width of the street enables them to pass away immediately?—That is so.

2005. I think you stated, in answer to the honourable Baronet, that you did not see any way of suggesting another penalty, than that of removing the licence, but would not the police penalties for breaches of the regulations laid down be an intermediate way of dealing with managers instead of having only one way as now of taking the licence away?—Quite so.

2006. That would be an intermediate way of keeping the regulations enforced in a theatre?—Quite so.

2007. Mr. *Hardy.*] When you say the theatre is emptied in four minutes, do you mean that the auditorium is cleared, or that the audience are quite off the premises?—They are off the premises entirely.

Mr. *Alexander Henderson,* called in; and Examined.

Mr. *A. Henderson.*

2008. *Chairman.*] I BELIEVE you are the Proprietor of the Criterion and Folly Theatres?—I am.

2009. The Criterion is one of the most recently constructed theatres, is it not?—Yes, it is the last constructed.

2010. As such did the Lord Chamberlain require an inspection of its construction before the licence issued?—Yes.

2011. And in that construction you have complied with suggestions by the Lord Chamberlain with regard to exits and the means of clearing the house in a certain time in case of panic, and other suggestions with regard to construction which were placed before you?—The theatre was licensed before I took it; it had been opened about two years before I became the lessee of the theatre, and I believe many alterations were made at the suggestion of the Lord Chamberlain.

2012. And the inspection has taken place since you have been the proprietor?—Every year, before the licensing day, the theatre is always inspected.

2013. Have any suggestions or recommendations been made to you since this Brooklyn fire, which has excited the public attention?—None for the Criterion Theatre.

2014. Will you describe to the Committee the modes of egress from the theatre, and the number of exits that there are for the public?—The principal exit and entrance to the Criterion is from Piccadilly, a very wide entrance; I should think it is nearly 10 feet to the stairway.

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2015. Is there a long passage?—It is down stairs for some distance; the stalls and dress circle come by way of Piccadilly.

2016. Do they come by separate exits?—They both enter by one passage, and that passage is fireproof, and that passage, I presume, will hold absolutely the whole audience from those two portions of the theatre.

2017. That passage being fire-proof, where the audience could remain long after the theatre was on fire with perfect safety to themselves?—Quite so; then the pit and gallery enter from Jermyn-street, at the back, with equally wide entrances.

2018. And with passages constructed of fire-proof material?—The passages are made of fire-proof material.

2019. Have you considered the time it takes to empty your theatre?—As Mr. Hare has told the Committee, the morning performances are very different from those at night, ladies not taking off their bonnets, but going straight into the street; I have had the theatre cleared and emptied in 2½ minutes, or 3 minutes at most, whereas in the evening the ladies wait for their bonnets in the cloak-room, and the gentlemen hang about the passages until the ladies come.

2020. But still the same history practically describes what would take place in case of fire, that the outlets would empty the theatre very rapidly?—The theatre might be emptied in two minutes I should think.

2021. What number does your theatre hold?—I should think the entire house would hold 650.

2022. Have you not got a curtain in the Criterion such as they have got abroad in some theatres, namely, an iron curtain or a wire gauze curtain?—No.

2023. What is your opinion with regard to them?—That they are utterly worthless; if a fire took place an iron curtain would burn as quickly as a calico curtain; the moment the heat comes upon the iron it is gone at once.

2024. You do not think that an iron curtain would be any protection, but at the same time it would add to the panic if let down?—I conceive that a fire in a theatre during a performance is an absolute impossibility; it is panic that you have to guard against; if you dropped the iron curtain down in the middle of the performance it would create a panic immediately.

2025. Still that fire which created the panic recently at Brooklyn took place during the performance?—It did.

2026. And what you would represent is, that the managers should, not only for the protection of their own property, but for the protection of the public, have firemen on duty during the performance, to protect it from a fire taking place at that time?—Yes; the Brooklyn theatre was not so protected; I know the Brooklyn theatre pretty well; my company has played in the Brooklyn theatre three times.

2027. Have you hydrants in the Criterion?—Yes; we have hydrants from the main at the Criterion.

2028. With high pressure?—With high pressure.

2029. As Mr. Hare has told the Committee he does, do you employ a man as fireman who has had experience?—Yes.

2030. Is he also one who was trained by Captain Shaw?—He was one of Captain Shaw's men.

2031. I suppose you would represent what Mr. Ponsonby Fane stated the other day, that the carpenter's cap was perhaps as good security as a fireman at the commencement of a fire; he puts it out immediately in that simple way?—Yes, the servants are properly drilled in the theatre; the carpenter is the head, and in my theatre in the case of a fire or panic they have all their separate duties to attend to.

2032. They are not only taught the duty, but they are actually rehearsed in them?—They are actually rehearsed; every person knows his special duty in case of accident.

2033. Mr. Hare stated that you were acquainted with and used a chemical preparation for making scenery incombustible?—Yes, tungstate of soda. When the canvas is new, if you saturate it with the tungstate of soda, it will not burn at all; it will merely smoulder; it will make it almost fire-proof, but you cannot make wood fire-proof.

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2034. You have adopted that with regard to your scenery?—Yes; I have applied it to all the new scenery.

2035. The scenery is a preparation of water colour?—It is primed with size, and that makes it uninflammable, You can turn a jet of gas on to a scene and it will not burn; it will simply smoulder through and it will go out immediately.

2036. The material which is employed in the preparation of ordinary canvas makes it to a certain extent uninflammable?—It does, but it becomes very dry after a certain time in the great heat that it is exposed to.

2037. I am requested to ask you whether you are quite sure that if this preparation when applied to canvas makes it incombustible, it might not also produce the same effect upon wood?—It does to a certain extent, but you can saturate the canvas, whereas you can only put it on the surface of wood as you would a coat of paint, and if fire were applied to it it would burn through, of course, in a short time.

2038. But if protected for a short time it would be of service, would it not, as allowing an opportunity of clearing your house, as far as the public safety is concerned?—Quite so; it would be of service.

2039. With regard to your other theatre, the Folly, will you tell the Committee the principle of its construction; that theatre is licensed by the Lord Chamberlain, also, is it not?—Yes, I altered the theatre from the Old Charing Cross Theatre in last August, and the alterations were made subject to the approval of the Lord Chamberlain, and upon his suggestion.

2040. With regard to the means of egress from that theatre, are they equally good with those from the Criterion?—The theatre is very different from the Criterion: the Criterion is much further from the street, whereas the Folly is only 17 feet from the street into the auditorium; that is all the distance you have to pass through.

2041. How many exits have you?—There are five from the house; the dress circle and stalls would hold 100 each; that is, 200 persons, and they have each a separate entrance leading into a vestibule 17 feet wide; and the entrance from the staircase is nearly 5 feet wide, and from the dress circle I think about 4 feet, 3 or 4 feet 4 inches; the two entrances lead into a vestibule 17 feet wide; in fact, 17 feet square you may say, and that is close to the street.

2042. And how many exit doors are there from that into the street?—One large wide door; the entrance door into the street is 10 or 11 feet wide. I am not quite sure whether it is not more. Then the pit and gallery have separate exits into a passage 5 feet wide.

2043. Is that passage of the same width all through?—It is under in some portions. The narrowest part of that passage would be 5 feet wide.

2044. Is that towards the theatre?—I think the narrowest portion of it would be nearer the street, but there are turns in the passage.

2045. Still there is that element of danger in it, that a large number of people being let into it are squeezed together at one part?—That is upstairs, so that there is that advantage.

2046. Is that on the level of the street?—It is below, and they come up to that level.

2047. So that the pressure is not so great as if the pressure were downwards?—If the pressure were from people pushing down behind, I think it would be more dangerous.

2048. Do you take the same precautions at the Folly Theatre as you do at the Criterion?—Yes, almost more, because when I took it a few months ago it was almost destitute of scenery, and I have had everything new put in there.

2049. So the public have three entrances distinct from each other; there is an exit with a couple of streams pouring into a vestibule of 17 feet square, and two other exits emptying other parts of the house, each of them five feet wide?—No, the pit and gallery both come into the same; bnt this is a very small theatre; altogether it would only hold about 550 persons.

2050. What leads into them?—A stone staircase all fire-proof. The entrances to the pit and gallery are fire-proof.

2051. The same security exists at that theatre as at the Criterion, namely, fire-proof exits for the audience?—Yes; before the license was granted (it was formerly

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formerly known as Woodin's Theatre) that was insisted upon, so that the persons in the front would be safe from fire; so that if there were a fire in front, if, for example, the Beefsteak Club were on fire, the people in the pit could get out quite safely.

2052. Has the theatre a house in front of it, between it and the street?—There is a shop in one portion of the theatre, and a shop with one room in front above it.

2053. What are the other exits which you describe as being available beyond those two?—There are two pit exits; one the exit from the vestibule into the street, which you may almost calculate as two; it was two until I altered it.

2054. I understand you to state that there were three exits from the theatre?—There are five exits from the theatre, but there are only two large exits into the streets. There is an exit from the stage separate altogether.

2055. Really there are two doors on the street; one of them serving for the gallery and the pit, and the other serving for the rest of the house?—The stalls and the dress circle use one exit, and the pit and gallery use the other.

2056. You heard the evidence, I think, of Mr. Hare with regard to the suggestion of Mr. Ponsonby Fane, that an authority should be appointed who should be entrusted with the supervision of the construction of theatres and music halls in the metropolis; do you see any objection to that?—In my opinion that is very desirable.

2057. Would you see any objection to the regulations laid down with regard to construction being enforceable by penalties?—Not the slightest.

2058. In fact it would give the managers of theatres a knowledge of what they had to comply with?—I think it would be very desirable to have such a system.

2059. And, by satisfying the public mind, would remove much of this panic legislation?—It would assist very much in doing so.

2060. Is there any other point you would wish to suggest as part of your evidence before the Committee?—I would suggest something which occurs to me as a very excellent mode of getting rid of panics in theatres, because I think fire is a myth; it has never occurred before whilst the audience were in; fires have occurred while the audience were not in. I would suggest this as being of some assistance in a case of panic: if there were the slightest alarm in a theatre no doubt the audience would get on to their feet and make a rush for the door naturally. I am speaking rather against my own interest, because it would be an extra expense; but the manager might employ old soldiers, or commissionaires, who, I suppose, are old soldiers, in each part of the house; it would be an advantage to have men who are accustomed to the word of command; they could do a good deal in allaying any difficulty; they could, at all events, break the crowd, and assist in stopping them from rushing.

2061. What you would suggest is that it would be wise on the part of proprietors to employ a certain number of men as a staff for regulating the exits of the people?—Exactly.

2062. Those men would be employed in regulating them on ordinary occasions, and would get accustomed to it in case of danger?—Yes; I think that men of that sort in uniform would have a great deal of influence over the public.

2063. If any regulations were made making these police regulations, and liable to penalties, you would suggest that there should be certain penalties for disobeying instructions of this kind?—I would.

2064. Do you think that the managers of theatres could practically regulate the outflow of the people in that way?—Yes; I think it would be a very great service in a case of panic.

2065. Mr. *Kinnaird.*] I gathered from your evidence that you thought the Lord Chamberlain's department were tolerably active?—I find them so; they are tolerably active with me at all events.

2066. And efficient in suggestion?—Very much so indeed.

2067. At the same time you would have no objection, I think, if there were apparently a more useful and practical supervision?—I have no objection to it, although I do not think it is required at all.

2068. Has it ever occurred to you that the Metropolitan Board of Works with their staff of surveyors would be efficient in that direction?—I have not given consideration to that matter, and could not give an opinion upon it.

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2069. Mr. *Forsyth.*] With regard to what you suggested about commissionaires, did I rightly understand that you would have commissionaires every evening in extra numbers in the theatres?—Yes; they might be used in the capacity of checktakers.

2070. I want to know what advantage there would be in having commissionaires in case a fire broke out; as you say there would be a great fright and everyone of the audience would rush to the door, what good would the commissionaires do?—I think they would have a considerable influence, being powerful men in uniform and accustomed to command. In the ordinary way the checktakers would run away.

2071. Do you think commissionaires would have the slightest command over a frightened crowd?—I think they might assist in checking a panic at all events.

2072. Mr. *Hayter.*] Would they regulate the exit of the people on ordinary occasions?—They might, and I should think they would. I think if they were considered of any value at all they should be used as ordinary checktakers, and they would also be of some use in regulating the exit of the audience.

2073. I suppose that your opinion is that audiences are very unwilling to be controlled?—I have been for 25 or 26 years a manager of a theatre, but I have never experienced a panic at all; therefore I am not an authority upon that point.

2074. It is the practice, is it not, in theatres in Paris to employ such men?—Yes, I believe there are some used there, but it is not much the practice here.

2075. Mr. *Locke.*] With regard to the Criterion, you say that below there are these fire-proof passages; are those covered with iron?—Those are built of brick arches.

2076. Is that arch very thick?—I believe it is very substantial.

2077. Supposing there was anything fell from above, would it probably, after it went through the top of this arch, go upon people's heads?—I cannot answer you that question.

2078. All you can tell is, that the place where people have to walk through is covered over with brick arches?—Yes.

2079. What the thickness is you cannot say?—I do not know.

2080. Do you know what is put on the top of it?—The building of the Criterion is upon it; the back portion of the building leading into Jermyn-street is built on part of it, and the large buffet, I believe, is over another part of it.

2081. What is the depth that people have to walk along from the street?—I should think it is from 30 to 35 feet.

2082. Is that under ground?—Yes.

2083. What would be the length?—It is not one long passage; it winds round.

2084. Is that upon the ground?—It leads to the ground-floor.

2085. You say that the passage is covered with brick arches?—Yes.

2086. Is it level?—You are going down stairs all the time, but round about.

2087. Who are the people that go down this passage?—The pit audience; they have separate entrances from Jermyn-street at the back.

2088. Where do the rest go?—From Piccadilly through a similar entrance, also fire-proof.

2089. Then they must go down?—Certainly, they must go down.

2090. Are those places in the same level as the stage?—When they are upon the ground-floor, of course they are level with the stage.

2091. If there was a fire the only place they could run out into would be into this passage?—Yes.

2092. Is that the only place they could get out?—The entrances are exceedingly wide, and very numerous.

2093. Do the entrances which have been built in this way go into the restaurant?—No; it is quite a separate building.

2094. You do not go up the same height to the street?—No; in entering the theatre you go down stairs immediately, and when you leave the theatre you come upstairs to the street.

2095. How

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2095. How do you get out to get into the street?—You must come upstairs.

2096. You might be burnt there?—That is all fireproof; in fact, the theatre itself is fireproof; the ceiling of the theatre is also a fireproof building.

2097. What covers the theatre itself?—It is under the vestibule of the Criterion.

2098. How is it covered?—I cannot tell you what the ceiling of the theatre is made of.

2099. The theatre could be set on fire, could it not?—If you tried to set it on fire, perhaps you could do so.

2100. If the theatre caught fire would the passages stop it?—The persons in the theatre could leave the theatre and go into the fireproof passages, and then by shutting the door you would inclose the fire in the theatre.

2101. What distance have you to go from the theatre along those passages to get into the streets?—From the floor to the ceiling of the theatre is from 30 to 35 feet.

2102. What part of the place do you pass through going through this 35 feet to go down?—It is the same passage whether they go up or down.

2103. Is it all fireproof?—Yes.

2104. Is it all fireproof with the exception of the theatre itself where the acting is going on?—Yes.

2105. It might catch fire there?—Yes; but there is ample exit for the persons in the theatre if it were to catch fire, and the moment they are outside they are in fire-proof passages; it is the safest theatre in London.

2106. Sir *William Fraser.*] We have heard a great deal of an iron curtain to be let down in case of fire, and I think you say that would be quite useless?—It has proved so.

2107. It would create a panic and would not stop the fire?—It would create a panic undoubtedly.

2108. I happen to recollect that in one of the largest theatres in London, I think it was Drury Lane, the one that was burned down, they had an iron curtain?—I do not recollect that.

2109. I recollect that in the prologue, when the theatre was opened, a lady gave these lines, speaking of the iron curtain, and pointing to it there—

> "Fire, we assure our generous benefactors,
> Will only burn the scenery and the actors."

And that theatre was within a very few years burnt to the ground, in spite of that iron curtain; there must have been an iron curtain or the lady could not have said that; however, it would merely give a false idea of security, in your opinion?—Quite so; an iron curtain would create a panic rather than otherwise.

2110. Do not you think that it is of very great importance, though there might be some little expense attached to it, that at each exit, and at each hydrant, there should be a man posted to attend to it?—There is a man at each hydrant, a man specially appointed to work it, and all the sub-servants of the establishment are put under his control.

2111. With regard to the doors, do not you think that whether temporary or permanent, it would be a good thing to have a man whose sole duty it was to see that these were clear?—That was what I was proposing with regard to the commissionaire. I thought that men who had been in the army, who had been there used to control and to orders being given, would be more likely to allay a panic than ordinary men.

2112. Have you ever been in a theatre when there has been an alarm of fire?—Yes, in Manchester this year.

2113. So was I on one occasion when Mr. Charles Matthews was playing in "A Game of Speculation;" the people rose with the greatest possible quietness; he came forward and said there was no danger; but I assume that if anything like flames or scenery were seen on fire there would be a very great rush?—Yes; the press can do a great deal to allay excitement if they would teach people to leave a place quietly on an alarm of fire; but since the fire at Brooklyn they have done everything they can to alarm the public.

2114. You do not think anything else can be done?—No; I think the idea of forming a body of men or anybody to go in advance of the Lord Chamberlain is unnecessary. When once a theatre is licensed, assuming it is a capable

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theatre, and ought to be licensed, then the whole thing is done; you do not want anything further. I do not think the examination of that theatre as Mr. Phipps said, two or three, or four times a year, is necessary at all.

2115. I believe this preparation of soda, which is commonly known as tungstate of soda, is not difficult to use?—Yes, as regards scenery you can use it upon new scenery, but you cannot use it upon old scenery.

2116. You could not use it with silk or satin dresses, I suppose?—No, only upon the lighter dresses. You could use it upon the others, but it would spoil them.

2117. It is only a matter of technical trouble?—That is all.

2118. Mr. *Hardy.*] The Committee have a very elaborate set of rules before them; do you know whether they are strictly attended to in theatres?—Yes, I believe so.

2119. For instance, do you get an ample water supply with hose and pipes?—Yes.

2120. Are your footlights protected by wire guards?—In neither of my theatres are the footlights protected by wire. I do not think it is necessary. I was not aware that it was in the Lord Chamberlain's regulations.

2121. In point of fact, these rules are not altogether attended to; in spite of Mr. Ponsonby Fane's inspection, you do not attend to that?—I do not attend to that. I do not think it is necessary, because in all our rehearsals our company are rehearsed four feet from the footlights.

2122. But surely a mechanical arrangement is safer, because if a woman is dancing she might turn her foot and come within the range of the lights without being aware of it?—There is no reason why it should not be done, except that it casts a shadow upon the scenes behind.

2123. It seems that these rules may be unobserved in two theatres without Mr. Ponsonby Fane finding it out?—I am not aware that it is not absent in a great number of theatres.

2124. Mr. *Clifton.*] You told the Committee that it was objectionable that chairs should be placed in the gangways?—I think it is very dangerous.

2125. Would you be surprised to hear that the public have sometimes been offered chairs in your theatre?—I offered some members of the Lord Chamberlain's office some chairs one night.

2126. I went the other night to the Criterion and was offered a chair?—I have four chairs in the stalls; there is a part of the stalls where we have space for chairs, but they ought to be permanent iron chairs. I have offered chairs to some members of the Lord Chamberlain's department when they have come late, but they have always declined them.

2127. You object to anything which is moveable?—Anything which is moveable is bad in a panic.

2128. Do you use the lime light?—Yes.

2129. Do you keep a gas-holder in the cellar of the theatre?—No, we have it imported into the theatre by bags; a regular man has the control of that department; I do not use it in the Criterion at all at present.

2130. Sir *Henry Peek.*] Did I understand you to say that you had a regular fireman to each of your theatres?—Yes.

2131. Mr. Hare told the Committee that he had one at his theatre too?—Yes.

2132. But Mr. Robinson, when he was asked, "In what proportion of the theatres a fireman was kept," answered, "Perhaps in five or six throughout London;" that surely cannot be right?—I think it is right.

2133. Do you mean to say that we have hit upon three out of the five or six?—Yes, I believe so. I do not believe there are firemen in more than that. I know it is exceptional.

2134. I gathered from you that your opinion was that after the licence is once granted by the Lord Chamberlain it ought to be irrevocable?—I think so; if it is a proper theatre and good enough to be passed once, it is good enough for all time.

2135. I suppose when a licence is granted to a theatre it becomes a valuable property, like a licence to an inn, or anything of that sort?—It would be a very hard thing if a man bought an old-established theatre and gave a lot of money for it, and a year afterwards his licence were taken away after he had been in occupation for one year.

2136. You

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2136. You think that the power of punishment, if I may use the term, which the Lord Chamberlain possesses, that of withholding a licence, would be very unjust?—It would be a very great hardship.

2137. Do you think it would be a very great hardship if he were to say that for such and such a breach of the rules I will suspend the licence for a month?—I think if he can find out any breach in the rules which he has made which are feasible regulations he is justified in compelling compliance.

2138. Supposing rules were made with regard to order and decency, would it be a hardship to suspend his licence for three weeks or a month in the event of infraction?—No, I think if he broke any of the rules he was called upon to keep it would be quite right that he should be penalised, or if it was a very bad case, that he should have the licence taken from him.

2139. But you would desire to see some power of enabling the Lord Chamberlain to modify the power he has at present of refusing?—Yes, I think I should.

2140. Mr. *Onslow.*] Have you read the rules and regulations laid down by the Lord Chamberlain?—I have them posted in my theatre.

2141. Have you read them yourself?—I have, but I am sorry to say you have called my attention to a rule I had forgotten all about.

2142. As far as you are concerned it appears to me that you may obey as much of these regulations as you like, and discard others?—I do not think that the one I have been called upon to account for is a very important one.

2143. That is a matter of opinion; it is a regulation?—It is.

2144. Another manager may say, I will not obey any such regulation, because I think it is a minor regulation; it appears to me that the managers of theatres can at the present time ignore any or a great many of the regulations of the Lord Chamberlain?—I do not think so; the rules from the Lord Chamberlain's office have lately been put in force.

2145. If you break one regulation why should not the proprietor of the Court Theatre break another, and the proprietor of the Adelphi break another; he might consider those rules which he breaks of as little importance as you consider this particular one. What I mean is this, that there is really no one to see that these rules are carried out, although they are issued from the Lord Chamberlain's office as rules which he considered necessary?—The Lord Chamberlain has not sufficient staff, I suppose, to send round to inspect our theatres.

2146. As a matter of fact those regulations are not enforced by the Lord Chamberlain?—They are supposed to be.

2147. Therefore those regulations which are issued by the Lord Chamberlain, at all events the Lord Chamberlain has no power to see carried out?—I presume he has the power to make us carry them out, if he came to the theatre and found that any portion of his regulations were not carried out.

2148. Or he might withhold the licence?—Yes.

2149. Do you always get notice of inspection from the Lord Chamberlain's office?—Yes, we do.

2150. And you put your house in order accordingly?—We do a little cleaning up more than ordinary.

2151. At all events you wish it to look at its best when the inspector comes round?—Yes.

2152. Mr. Hare has told us there is no reason at all why they should not come sometimes during the night and inspect; and he says, that that would in his opinion be a better inspection than an inspection by day; do you agree with him?—I think that the only person whose inspection would be worth anything would be, as Mr. Hare says, the fireman's. I do not think the Metropolitan Board of Works or anyone else would be of any use; it is the case of fire which you are seeking to guard against. The fireman could come in when the performance was going on, and would have a better opportunity of judging then than he would have in the day-time.

2153. And if anything were wrong, the fireman could bring it to the notice of Captain Shaw?—Yes.

2154. Would you empower Captain Shaw to inflict fines and penalties?—No; Captain Shaw might be empowered to call upon us to remedy anything that was improper on the stage or in the theatre with regard to the lights.

2155. Have you considered whether those passages which you have at the

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Criterion, by the draught which they would cause, would be likely to enhance a fire?—No, the ventilation of the Criterion is very peculiar; it is done by machinery, and if a fire were to break out upon the stage, because it must be there, for you could not set fire to anything in front, we could absolutely stop the draught in the passages immediately.

2156. Mr. *Ritchie.*] With regard to the iron curtain, the opinion which you have formed as to an iron curtain is based upon a single iron curtain, is it not?—Yes, a curtain which would go up and down.

2157. Do you not think a double one would be more effective?—It would be more effective of course, but my opinion about an iron curtain is this, that if a fire were to take place in a theatre, at the flies or behind the scenes, and that iron curtain were dropped, the audience would know immediately that there was danger, and you would create that very thing you wished to avoid, namely, a panic.

2158. *Chairman.*] Under the present powers of the Lord Chamberlain, as I have just pointed out, the particular taking away of the renewal of a licence is all that he can do; that practically would fall upon a great number of people besides the person who would be supposed to be guilty, that is to say, the manager, and would deprive a number of people of employment, and is so very severe a penalty that in all probability the Lord Chamberlain would never enforce it; but if a power of temporary suspension were granted, as a punishment, the same difficulty would arise, would it not. One of the witnesses has suggested to the Committee that it might be possible to suspend a licence once granted for an infringement of the regulations, as an alternative to a suggestion which another witness made as to the enforcement of them by police penalties. Mr. Phipps thought it might be desirable to suspend them for a time; do you think that would be practicable?—That would be almost as bad as taking the licence away; you would throw a grear number of people out of employment. I think if anything were wrong with a theatre, that is to say, if the manager were called upon to make alterations and refused to do it, then I think the Lord Chamberlain would be justified in suspending the licence until he did comply with the orders given to him.

2159. There is no power to do that, is there?—I think the Lord Chamberlain could refuse to grant a renewal of the licence.

2160. It is an annual license, is it not?—Yes.

2161. Consequently his refusal could only come into effect when application was made for a renewal of the license on a particular day?—I think so.

2162. He might then suspend it, it is true, until the alterations had been completed?—Yes.

2163. But that would fall not only on the manager, but on all the staff of employés and others, who were not guilty of the original fault?—It would really fall upon the manager.

2164. Do you mean that it would fall upon the manager, because the company would be retained during the term of suspension?—Yes; the manager could not discharge his company.

2165. So that practically it would fall upon the manager?—Yes.

2166. You stated that you did not see the necessity for the visits of the inspectors after the place was once approved; but occasional inspection would be necessary, would it not, to see that these rules were complied with?—Yes.

2167. And to that extent inspection would be necessary?—Yes; what I meant by that was that when once the theatre had been licensed with proper doors, it would be finished with.

2168. For the purpose of construction you would get a licence once for all from the permanent authorities?—Yes.

2169. And then the annual inspection would be necessary in order to see that you had not violated those conditions, or such inspection as was necessary to see that the doors and so on were of the proper construction?—That is what I mean.

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Thursday, 19th April 1877.

MEMBERS PRESENT:

Mr. Clifton.	Mr. M'Lagan.
Mr. John Stewart Hardy.	Mr. Onslow.
Mr. Hayter.	Sir Henry Peek.
Sir James M'Garel Hogg.	Mr. Ritchie.
Mr. Kinnaird.	Sir Henry Selwin Ibbetson.
Mr. Locke.	Marquis of Tavistock.

SIR HENRY SELWIN IBBETSON, BART., IN THE CHAIR.

Mr. *Morris Abrahams,* called in; and Examined.

Mr. *M. Abrahams.*

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2170. *Chairman.*] You are the Proprietor, I believe, of the East London Theatre?—Yes, and also of the Pavilion Theatre.

2171. And as such you can tell the Committee, with regard to the inquiry which is before them, first, the method in which your license was granted; you are under the Lord Chamberlain, I believe?—Yes.

2172. On your application for a license with respect to these theatres, had your houses to undergo an inspection by the authority?—Yes, once every year; an annual inspection.

2173. That is to say, an inspection previous to the renewal of the licenses which you hold for the theatres?—That is so.

2174. And that inspection goes into the whole details of the construction of the theatre, the modes of egress from the theatre, and the amount of protection with regard to water supply and otherwise against fire?—Every little detail is gone through.

2175. Have any alterations been suggested since you have been proprietor of your two theatres in either of them by the Lord Chamberlain?—Many; one theatre, that is the East London Theatre, has been rebuilt twice within the last 21 years.

2176. Was that in order to comply with new requirements with reference to safety in construction, or for the purpose of enlargement?—I may say for the purpose of enlargement, and likewise to meet the views of the Lord Chamberlain.

2177. Could you tell the Committee, with regard to the East London Theatre, what the plan of the theatre is, and what the number of exits are from it?—We have four exits from the pit; that is to say, there are two side entrances, and one on each side of the theatre. We have three from the gallery; one, I may say, almost from the centre of the gallery, and one at either side of the gallery; in the boxes we have two, one on either side. In fact, I may say, that having plenty of room at the time when the East London Theatre was built, we took every precaution against fire or panic.

2178. Are those exits distinct as to their being separate passages, so that there is no chance of the people coming from different parts of the house getting blocked in any one of them?—I think in the East London Theatre I might almost say that all the passages are separate.

2179. Is there any length of passage before you come to the street, taking the pit first?—We are very near the street in the East London theatre. The theatre is parallel with the street, therefore the passages are very short; in fact, I might say, that a person passing in the street could almost look into the theatre, provided all the doors were open.

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2180. Therefore, the doors being opened, the audience would be immediately delivered into the street?—As nearly as possible.

2181. With no chance of their being blocked by the narrowness of the passages?—Not at all.

2182. Of course that does not apply to other parts of the house; there are a number of passages and staircases from them, are there not?—There are staircases from the boxes and likewise from the gallery.

2183. And with stone passages to them?—No, there are no passages to the gallery; the audience would go directly down the stairs into the street.

2184. The doorway is directly at the foot of the stairs?—Yes.

2185. That is a distinct exit from those used for the other parts of the house?—I cannot exactly say that they are precisely the same; you go direct from the gallery into the street.

2186. What I meant was that, supposing a panic occurs, which is really what one is afraid of, is there any chance of the audience from any other part of the house blocking the exit door to the gallery staircase?—Not that I am aware of. I have never found it so in a panic, and I may say that on two occasions I have had to cope with panic, and I have never felt the inconvenience which you have now put to me.

2187. Do you mean to say that you have had an alarm of fire in the theatre?—I have.

2188. Upon that occasion had you a full audience?—A very large audience.

2189. From your experience what was the result of that panic; how long a time did it take to clear the audience from the house?—Upon one occasion the panic I am now speaking of occurred upon Boxing-night, and I am pleased to say that there were very few indeed of the audience that were let out of the theatre, from the simple fact that I knew the panic was groundless, and that there was no cause for alarm. The panic arose through a pan of fire before the performance commenced by some means or other becoming ignited. I gave orders to my men to keep the people in the theatre, and do all they possibly could, and they did do so; the manager came in front and told the audience there was no cause for alarm; the curtain rose, and the performance went on; and though we had very great difficulty in keeping the people back on that occasion, the people were very few who did leave the theatre, although the alarm was very great.

2190. You say "upon one occasion"; have you had more than that experience?—Yes; we had a panic some 18 months ago, originating in a fire caused by the notorious Wainwright. He had a brush manufactory next door to the Pavilion Theatre, and that caught fire, and the fire from that building covered the whole of the front entrance to the Pavilion Theatre. Upon that occasion there were from 2,000 to 2,500 persons in the Pavilion Theatre, and an alarm was caused in the theatre through that fire; of course our officers and men were on their guard on that occasion. We could not possibly permit any of the audience to go out at what I should call the principal entrance. We were then left entirely to what I may term the safety-valves of the theatre, namely, the doors which we open in case of panic. We made use of those doors, though the people were, I must confess, panic-stricken, and I must say not without cause, for there was a fire raging next door, although it could never reach the theatre, but upon that occasion everybody left the theatre without a casualty.

2191. That was in the Pavilion Theatre?—Yes.

2192. Have you the same means of egress there that you have in the East London Theatre?—Yes.

2193. You say you depended upon your safety-valves; that is to say, doors made for panic and emergencies?—Yes.

2194. In the East London Theatre are they used for ordinary occasions, or are they kept for cases of emergency?—They are kept for cases of emergency, but they can be used if occasion requires at any time.

2195. Is there any notification to the audience of their being available?—"Exit in case of fire," or "in case it be required," is put up over them.

2196. Is that the placard printed on each of those doors?—Yes; printed upon each door.

2197. How

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2197. How do the audience become aware of that; do they pass those doors in going to their seats?—Yes, they do.

2198. Those doors have posted upon them in such a way as to make the audience generally acquainted with them, a notice that those doors are available in case of emergency?—Yes, that is so; but our being rather a local theatre, I think there would be very few indeed who would not be fully acquainted with the entrances and exits of the theatres.

2199. Are those entrances kept fastened, or are they always kept open during the performances?—They are always kept open.

2200. That is to say, they are kept so that they can be opened at once by anybody in a time of panic?—Quite so; I think they would be worse than useless if they were not kept open, because the people would look for exit from those doors and could not open them. I have always taken the precaution of keeping every one of those doors open.

2201. There are no attendants at these doors because they are not in use at ordinary times?—No; there are no attendants kept there, but my men have orders to fly to the doors instantly in case of panic or emergency.

2202. With regard to the regulations which are published by the Lord Chamberlain's office, you are acquainted with them, I suppose?—I am.

2203. Are those regulations always carried out in your theatres?—I have them carried out in my theatres.

2204. With regard to the protection of the gas by a wire guard, is that regulation carried out?—It is certainly carried out to a very great extent; at times there are open lights used, but very seldom indeed.

2205. I suppose you mean the open lights which are distributed between the wings?—Upon the ground rows; the ground rows of lights are not invariably covered.

2206. I think the Lord Chamberlain's regulations suggested that the first ground row should be always covered?—Always covered.

2207. And that is done?—That is done.

2208. I believe the regulations do not go further than that?—No, I do not think it is really required.

2209. With regard to a question which was asked of another witness, whether it would be possible to protect the lights between the wings which are used in the scenery by wire gauze, do you think that would be possible?—I really do not think it would be possible. I think you had better have no protection at all than to have a protection that you could not get at very easily. We have at the Pavilion and at the East London Theatre bridges running across the stage, so that if anything occurs men can run from one side to the other at the top.

2210. I suppose whenever there is this lighted up scenery, which is necessary in some of your performances, there are men told off to watch the lights, to see if anything does occur of the kind, and that they would be able to put the fire out before any real danger arose?—I think every mechanic in the establishment would know just as well how to cope with a fire if it occurred as the party who is supposed to be at the head of that department.

2211. That leads me to ask have you a recognised person in charge of the fire arrangements at your theatre?—The gas engineer in my theatre has charge of the hose, but as I before observed, I always feel it my duty when any strange mechanic enters my theatre to draw his attention to the fire-hose and the pails and buckets, and other matters which might be handy in case of fire.

2212. So that practically the whole staff of your mechanics and workmen employed in the theatre are useful in case of fire, or any emergency?—That is so.

2213. But you have not, as one of the previous witnesses had, one of the old employés of Captain Shaw in the fire brigade, attached to your theatre?—I have not.

2214. Not at either of them?—Not at either of them.

2215. Have you adopted any of those preparations for making scenery incombustible which we have heard of?—No; I cannot say that I fall in with that view myself. I do not think it is required.

2216. You would I suppose say that the preparations with which the scenery

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is covered, the water-colour mixture, and the size with which it is prepared, render the canvas almost incombustible in itself?—I should say so.

2217. You do not think it would be advantageous to assist the protection of the theatre by any additional securities?—I will not go so far as that, but I will say that I do not think it would be very efficacious.

2218. With respect to the construction of your two theatres, have you got in both of them a fire proof separation, as between the audience part of the theatre and the stage?—They are modern-built theatres, and everything required by the Lord Chamberlain is provided.

2219. Can you say whether that which has been represented as a great security, namely, the wall which separates the stage from the auditorium, is carried right through up to the roof?—It is.

2220. Have you any fire-proof construction for the storage of material, and for the passages; was that attended to at the time of the building of the theatre?—Particularly so.

2221. So that, in your case, as in the case of the gentleman who is the proprietor of the Criterion, the passages which communicate to the exits have been made fire-proof?—They are fire-proof, composed of iron and stone.

2222. I think you were present at the time when the evidence was given before this Committee with regard to the Lord Chamberlain's office, and heard the suggestion which was made with reference to creating another official department of some kind, which should have complete control over the construction of theatres?—I was.

2223. In your opinion, would that be a satisfactory arrangement?—It would.

2224. You would agree that if such a department were organised, which must of necessity give a certificate with reference to construction, in the first instance, before any license issued, it would protect you from any sudden changes suggested by panic or public excitement; you would have studied all those alterations in the first instance?—We have studied that at the present time. A person building a theatre must have his own surveyor; then there is the district surveyor and the Lord Chamberlain's surveyor, and I think that a certificate from these three gentlemen would be sufficient. I should have no hesitation about having half-a-dozen certificates, but I do not think it would be much stronger than having a certificate from the district surveyor and the Lord Chamberlain's surveyor.

2225. The Lord Chamberlain issues the license after having satisfied himself with reference to the construction by his architect; now Mr. Ponsonby Fane has stated to the Committee that the Lord Chamberlain has no power of enforcing that construction except by the very violent method of taking the license away altogether, and suggested that a department should be set up charged entirely with this superintendence of construction, and that the Lord Chamberlain's action should be limited to the mere issue of the license and supervision of the regular conduct of the theatre after it was once started; would you concur in that suggestion?—I think that those would be very wise changes. I take it from that that the surveyor would be the district surveyor, for he, I should say, would be the proper party from the simple fact that if it be a modern building the district surveyor must overlook that building during the time of its erection. If it be an old building, and any structural alteration takes place, it must be done under the superintendence of the district surveyor, so I think you could not do better than leave the matter in the hands of the district surveyor.

2226. That is under the Building Act?—Yes, under the Building Act, subservient I presume to the Metropolitan Board of Works.

2227. Instead of making a fresh Government department, you think it would be sufficient if the district surveyor was entrusted with the power of certifying in the first instance, and that that certificate should be subject to approval by the Metropolitan Board of Works, and that the Lord Chamberlain's license should never issue without such certificate being obtained?—Undoubtedly.

2228. Then with regard to the regulations which from time to time issue from the Lord Chamberlain's office, do you see any objection to what has been suggested that they should be made police penalties, so that compliance with them might be enforced by a less punishment than the taking away of the license from a theatre?

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a theatre?—When you speak of their being matters of police, I think that is open to objection. I question very much if the responsible managers of the present day would care about being under such rules as those.

2229. It has been put before the Committe in this way: It is known, for instance, that occasionally from pressure and other things, chairs are put to fill up gangways. There is a regulation made that those chairs should not be allowed to occupy the gangways, but the infringement of that regulation can never be enforced, because the only penalty at the present moment is, when the license is applied for on the renewal day, to refuse it, which is far too severe a penalty for that offence; but it has been suggested that that might be made a police penalty, so that you could bring up a manager for the infringement of those regulations, and then he would naturally be responsible for the acts of his servants; then there would be a small penalty or a fine for the infringement of those regulations which could in that way be enforced?—I do not regard the placing of chairs in the passages in so serious a light as many people, and do for this reason: I find, having had a little experience in theatres, that you are safer if you can possibly keep the audience in the theatre, and keep them from rushing to the doors. I believe it is only when the audience make a great rush to the doors that life and limb are at stake, therefore (to my way of thinking), if the chairs were there, and impeded some of the audience from reaching the door, I do not think their operation would be of so serious a nature as some people would think in respect of panic. I think they would rather keep back the people than otherwise. However, I need not deny that I know some people object to them very much.

2230. I only mention that as being an instance which has been put before the Committee to justify the setting up of some more strict means of enforcing the regulations; but with regard to all the regulations which are issued, such as the fastening of the doors where they are always supposed to be swinging doors in the passages, if that rule were infringed, do not you think that it would be a better mode of enforcing its observance, by allowing a certain penalty to be inflicted for an infringement of such a rule as that, than to wait until the licensing day came round, when it might be made a question of withholding the license altogether?—As we do not use chairs in minor theatres, and as I have never had much or any experience in West End, or the better class theatres, you will pardon me if I say I had rather not give an opinion upon that, as I do not feel conversant with the matter.

2231. It has been suggested by the Lord Chamberlain as a simpler mode of enforcing regulations than that which at present exists, and I wish to know whether you have any opinion upon it?—I would rather not give any opinion upon it, but I do not regard the placing of chairs so seriously as many other people do.

2232. What you mean is that as the doors and passages must be narrow, and if you can regulate your rush it is far better than to allow the people to get out as they please in the rush?—The more people you can keep back in the theatre at the time of a rush the more likely you are to get your people clear out; if all those people who are in the pit, boxes, and gallery make a rush for a certain door it is quite impossible that they can flow from the passages as they enter, but if your men are at their posts and keep the people back, as they can do if they are calm and cool to a very great extent, they will all probably get out safely. I have undergone these panics, and I find that under these circumstances you can clear your theatre without casualties.

2233. Have you any record of the time it took to get the audience out of the Pavilion Theatre when you were under the panic?—No; we were only too happy to get the audience out of the theatre on that occasion; we did not take any record of the time they took in going out, but the Lord Chamberlain's officials were at the theatre on the night of the third or fourth performance of the pantomime this year, and I am told that the theatre was cleared in from 3¼ to 4 minutes upon that occasion.

2234. That was a night performance?—Yes, and one of the largest audiences we have had at the Pavilion Theatre.

2235. What is the number that the Pavilion Theatre holds?—I should say upon that occasion there would be 3,000 persons there.

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2236. And those 3,000 persons were out in the street in between 4 and 5 minutes?—Yes.

2237. Is there any suggestion which you would like to make with regard to the subject which is under the consideration of the Committee, that is to say, with regard to the alteration of the present system of licensing in respect to providing greater protection for the public against panic of any kind in cases of fire.—I do not know that any better code of laws could be laid down than are in vogue at the present time under the Lord Chamberlain. If those laws are abided by, if hydrants are properly placed on the stage, and if the hose be in proper order, and a good supply of water, my firm impression is that it is almost next to an impossibility for a fire to any extent to take place during the time of performance whilst the officials are about the theatre; you cannot of course prevent a panic.

2238. You have mentioned the supply of water. I suppose you have a supply of water at each of your theatres on the high pressure system?—Yes, we have three hydrants at the Pavilion Theatre, and two at the East London Theatre.

2239. Are those hydrants in the stage or the audience part of the theatre?—We have three hydrants on the stage at the Pavilion.

2240. Therefore all you would represent is that you think an alteration might be made in placing the original construction and the survey under the district surveyor and the Metropolitan Board of Works, instead of leaving it to the management as it is at present of the Lord Chamberlain, who inspects by the architect he names?—I do indeed agree with an inspection such as was proposed the last time I was here. It was proposed then that the inspectors should be permitted to enter the theatre at any time.

2241. You would see no objection to inspection at any time that the Lord Chamberlain wished to see that the regulations were continuously carried out as has been suggested?—Not at all, nor do I think that the manager of any well regulated theatre would object. I might mention a little matter which probably some day might obviate a panic. In front of the East London Theatre, and likewise in front of the Pavilion gallery entrance there is a fire-plug. Now about 14 or 15 months ago a fire took place within 50 or 60 yards of the gallery entrance of the Pavilion Theatre. Upon that occasion an engine drove up and began to play, and consequently you may be sure the officials and myself did not feel very comfortable while the engine was there, feeling that the alarm might reach the theatre, for I need scarcely tell you that you have only to mention the word "fire" within a theatre, and the audience do not take time to consider where the fire may be, but take alarm, and hence we might have a panic. Upon that occasion I took the precaution, as I had done upon a similar occasion at the East London Theatre, of not admitting a single individual into the theatre. They could go out if they felt inclined to do so, but they could not go in again, and there was not a single individual admitted either behind the stage or in front. We may be fortunate once or twice in obviating a panic in that way, but not always, and I am quite sure that if Captain Shaw knew that he would remove the fire-plug a little lower down. Upon that occasion we were placed rather in a dilemma, for it so happened that one of my principal actors was out, and my orders were so stringent that no one should be admitted, that he could not get in, and we had to play the last piece without the principal character, which the audience did not care much about.

2242. You would represent that the Metropolitan Board of Works or the local authority in placing those fire-plugs should not place them directly in front of a theatre?—Quite so; not in front of the principal entrance. I think it might prove very detrimental to the management, and to the public likewise.

2243. Mr. *Ritchie.*] Do not you think that a fire-plug, although it may be objectionable in the way you speak of, is, to some extent, a protection to a theatre in case of fire?—It might have been some years back when hydrants were not so placed as they are at the present time, but I do not think it would make much difference if the fire-plug were placed five or 10 yards from a theatre. I had to take the precaution of closing every door in the theatre, and that is where I am at a disadvantage, because in the ordinary way, at other times,

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times, I should take the precaution of having the doors open, so that the exit might be instantaneous in case of fire or panic.

2244. But a fire-plug outside a theatre in the case of a fire might probably be of more service than a fire-plug inside a theatre?—Yes, quite so; but I only suggest that the fire-plug should be removed a little further away.

2245. You stated that you did not believe in the solution which has been referred to for the preservation of scenery, and so on, because you did not believe it was efficacious; were you speaking of any particular solution?—I have never tried it, therefore I would rather not give an opinion upon the matter.

2246. But if there were a solution which was efficacious, and prevented anything saturated with it from taking fire, do not you think it would be very desirable to have it applied to the scenery and the dresses?—More especially for the dresses; I do not think it would be so efficacious for the scenery, because I think that the scenery is not at all combustible.

2247. But we have it in evidence that most of the fires occur in consequence of the scenery coming in contact with a naked light; that was what burned down the Brooklyn Theatre; so that if scenery be combustible, and there is anything which renders the scenery incombustible, it would be desirable, would it not, to use it?—I cannot say that any precaution should be omitted.

2248. And the same with the dresses?—Yes.

2249. The lights in your flies, I take it, are covered over with wire gauze?—I think so; I am not certain.

2250. In most theatres the lights in the flies, which, I take it, are behind the stage, are covered, are they not?—Yes.

2251. Do you know whether they are let down, or partially let down, on to the stage to be lighted or not?—No, they light them from above.

2252. Those lights which the honourable Chairman particularly referred to are the moveable lights in the wings; those are not covered, are they?—Sometimes there are occasions when they are not covered; but when those lights are used we invariably have men to look after them.

2253. To stand by them?—Yes, to stand by them.

2254. Do you see any reason, if the other lights in the theatre are protected by wire netting, why those should not be protected by wire netting?—I do not see why they should not; but they are always protected by iron, and so on.

2255. In what way are the lights protected by iron?—They hang, as it were, on an oblique piece of iron; there is iron at the back of them. I have never yet heard that any danger has arisen through the lights you mentioned being uncovered, although I do not mean to say that it would not be quite as well to have them covered; but you would not get the same light if they were covered, and they are not very often used.

2256. That may be the case in your theatre, but I have been on several occasions into theatres, and on every occasion I have seen these uncovered lights hung at the wings?—I do not think they would be commonly used.

2257. Do you think that if a regulation was made that all lights used upon the stage should be covered by wire gauze more or less close, it would entail any difficulty or disadvantage upon managers?—I cannot conceive that it would; it might be a little inconvenient, but I think it would be an inconvenience which could be got over; still I do not see the danger in these open lights if they are not used too freely.

2258. Is your property room under your theatre; that is to say, is the place where you keep old scenery and furniture not in use, underneath the stage?—No; our property room at the Pavilion Theatre and at the East London Theatre is on the stage; that is to say, from the stage we have what we term a ride, that is to say, a long corridor or passage which we make a property room of; there is an excellent property room there: we can drive a carriage and pair through that property room, from the street to the stage.

2259. It struck me that a place where the people had to go backwards and forwards frequently, was an element of danger?—I do not think there is much property or scenery kept in the metropolitan theatres at the present time. I have myself arches to take the scenery that I am not using. Of course what property we are using must be in the theatre, but what we are not using is carried out when the piece is over.

2260. You would consider it better for the scenery not to be underneath the

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stage?—It is better that you should clear your departments, but still at times we have to use a good many properties, and they of course must go some where.

2261. You stated that you did not see a disadvantage, but in fact you appeared to see an advantage in having chairs in the gangways?—I will not go so far as that; I said I did not regard it in so serious a light in case of panic as other people.

2262. I think you stated that it would be an advantage to keep people in a theatre, and that anything that would impede people getting out would be an advantage?—From making a rush to the door, undoubtedly.

2263. Do not you conceive that in case of a panic, when people were making a rush, loose chairs would be very dangerous?—To any extent they would.

2264. Could you not conceive that one chair would cause some one or two people, who were making a rush, to tumble head over heels chair and all, and that it would be impossible for them to rise, and that in consequence of that great loss of life might occur?—There is no doubt you are very much better without the chairs, but to say what would or would not occur in a rush, would, from the experience which I have had, be very difficult.

2265. But I ask you whether there would not be a danger in having loose chairs or sofas in the way, if a rush took place?—I have had no such experience, because we use no chairs at the East London or at the Pavilion theatres.

2266. But anybody can form an opinion upon that, that the people would knock the chairs over, and fall over with them?—No doubt they would.

2267. We know that much of the loss of life that has occurred in emptying a theatre under a panic has been caused by people being trodden under foot, and so causing a block?—I have never heard of such a thing in the interior of a theatre; that has always occurred in the passages or corridor of a theatre. I have heard of people being injured slightly, but never of people being killed in a theatre, therefore I say the more you can keep people in a theatre, if they are panic-stricken, the better, so long as you can keep your passages clear, that they may flow away; and I think that if the managers of the metropolitan theatres adhere to the rules laid down by the Lord Chamberlain, there would not be anything of the kind to fear in London for many years to come.

2268. Still I may take it that loose chairs are an objection?—No doubt in quantities they would be, still I do not wish to place the fact of a few chairs being placed in the entrances to the boxes in so serious a light as some people do.

2269. It is very good of you to say so, because any regulations made with regard to chairs would not affect you at all?—Not at all. I do not think we use any chairs, except a few in the private boxes.

2270. Then you say you have side doors which are always open, and always available; it may be that your theatre, being of a purely local character, people know that those exits exist as a matter of fact, but do not you think that as those which you call extra modes of exit exist, it would be well to use them always, so that people might be always acquainted with them?—We do use them very often.

2271. Do not you think it would be wise to make use of them as recognised modes of exit always?—I will not say that all those exits are not always used when the theatre is cleared. I think they are.

2272. Whether they are or not, do not you think they should be in order to make people acquainted with them?—I think they should be in order to make people acquainted with them.

2273. Do you ever see whether your water arrangements are in order at all, by exercising your men in the use of the hydrants?—Yes, we do.

2274. Do you think it would be advisable that any fire in a theatre, however slight it might be, should be the subject of a report to the Lord Chamberlain if things exist as at present, or to the surveyor if a change is made, as has been suggested?—A report would be sure to be made however trivial a fire might be through the fire insurance companies.

2275. You might have a fire which was not of sufficient importance to make a claim for, but the question is whether any fire occurring in a theatre, however slight

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slight it may be, should be according to the regulations of the Lord Chamberlain, subject to be reported to him?—I cannot say that it would be a wise course, because I think if that was put before the public it would produce more danger: that you would alarm the public mind to such an extent that we might be always prepared for a panic; if it were kept private it would not matter so much.

2276. I mean a private report to the Lord Chamberlain that he might send down an agent to see if that fire took place by the neglect of any one in a theatre which might afterwards be remedied; that is my idea?—I do not see any objection to that.

2277. The Pavilion Theatre has been burnt down, has it not?—Not under my management.

2278. But it has been burnt down?—It has.

2279. Twice, I believe?—I do not know; I have not experienced it.

2280. You had nothing to do with the Pavilion at that time?—I have been only lessee of the Pavilion Theatre six years.

2281. Is it within your knowledge that there was loss of life at the previous burnings of the Pavilion Theatre?—None at all.

2282. Do you know whether those fires occurred during the performance?—No; the fire occurred after the performance.

2283. On each occasion?—I cannot speak with certainty with reference to the first fire; I can to the second.

2284. Have you any experience of the music-halls in the east of London?—I have visited the music-halls in the east of London, but I cannot say that I have had much experience of late years.

2285. I suppose that your experience of theatres and music-halls in the east of London does not lead you to suppose that they are in any worse state of protection than they are in the west end of London?—I should say that there would be if anything better protection than in the theatres of the West End, for the simple reason that they are modern built theatres; that would apply to three out of four of them, the Britannia, the East London, and the Pavilion; the latter in particular has been reconstructed under the rules of the Lord Chamberlain. When I took possession of the theatre it was almost entirely reconstructed, and a new stage was built; I do not think that theatres were so well protected in former years as they are at the present moment.

2286. You think, speaking of theatres, that if anything they are better protected in the east end of London than in the west end of London against fire?—I will not say that exactly; but I would say that ours are modern built theatres, and we have modern built theatres at the West End also.

2287. You are sure at any rate that they are not less protected?—They are not less protected.

2288. Can you say anything with regard to music-halls?—I would rather not say anything about music-halls at all.

2289. Have you no knowledge of them?—I have very little knowledge of them of late years, and therefore I would rather not speak of anything with which I was not thoroughly conversant.

2290. I do not wish you to speak of any matter of which you have not personal knowledge, but if you can give any facts which will conduce to the success of the Committee we shall be obliged?—I have had some experience of concert-halls, but of late years, since they have grown to such a very large extent, I have had very little experience indeed, and you may take my answers for what they are worth.

2291. Do you see any objection if theatres are put under the superintendence of some surveyor, to putting the whole of the music-halls under the same arrangement?—When you speak of music-halls are you speaking of the large establishments, or are you speaking of the halls which are in public-houses; "free-and-easies," as I might term them, which would hold 60 or 80 persons.

2292. I take it that some fresh arrangement would have to be made with regard to those particular houses, but I am speaking of music-halls where large numbers of persons congregate; do you see any disadvantage in placing them under any regulations under which theatres are placed, as far as inspection by a survey is concerned?—I see no objection to it myself; of course concert-hall proprietors might answer differently.

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2293. Speaking from a public point of view, do not you think it would be an advantage?—I think so from a private point of view. If an inspector called at my theatre once or twice a week I should feel very much more comfortable in my mind that the management of the stage would be well carried out. I think that it would take a certain amount of responsibility from the proprietors, and I cannot think that any manager of a theatre would object to it.

2294. That is rather an important answer which you have given; I may take it that your reason for assenting to this suggestion is, that it would relieve you from that responsibility?—I do not say that it would in the true sense relieve me from any responsibility, but I think if I had the advice and assistance of a surveyor in my theatre once or twice a week it would assist me materially.

2295. You mean looking at responsibility in a moral point of view?—Yes.

2296. Mr. *Onslow.*] With regard to the panic which occurred at your theatre; how many persons were present upon that occasion?—I think probably upon that occasion there were from 2,000 to 2,500 people present.

2297. How many will your theatre hold?—It will hold 2,800.

2298. I suppose in your theatre, being in the east of London, you have more accommodation in the pit than theatres in the west of London?—The pits are rather commodious. I cannot say that the accommodation is greater, or probably quite as much. We give them plenty of room, if that is any accommodation. We do not give them any armchairs to sit in in our pits.

2299. Is it the case that the accommodation in the pit, comparing it with other parts of the theatre, is greater in the theatres in the east of London than in the west; that is to say, does your pit contain more in proportion to the other parts of your house?—No, I should say not; I think they are about equally divided, pit, gallery, and boxes.

2300. Can you tell the Committee what improvements have been made in your Pavilion Theatre for the protection of the public from fire, as compared with the old Pavilion Theatre which was burnt down?—Great improvements have been made; in fact, when we made the alterations they were made subservient to the rules laid down by the Lord Chamberlain, and under the superintendence of the Lord Chamberlain's surveyor. There were any quantity of doors and exits provided.

2301. Were there more exits provided than there had been before?—Considerably more

2302. Do you recollect how many exits there were in the old Pavilion Theatre?—I do not.

2303. You have not a fireman always on duty at either of your theatres, have you?—No, I have not a fireman always on duty; the gas engineer is supposed to be there, and is there during the day, and when he leaves a watchman takes his place at night.

2304. Have you heard the evidence given before the Committee, that there are firemen at some of the theatres in London?—I have heard so.

2305. Do you know any theatres in the east of London at which a fireman is always on duty?—I believe there is always a fireman on duty at the Britannia.

2306. But you do not think it necessary?—I do not think it necessary. I believe the night watchman is capable of doing anything that may be possibly required in case of emergency.

2307. He would be able to lay on the hose himself?—We have the hose always ready for use at any moment in the centre of the stage, and also at the side.

2308. Have you anyone connected with your establishment who, during the performance is particularly told off in case of fire?—The gas engineer we always look to as the principal in the case of fire, but as I observed before, I think they are all equally capable of using the hose wherever it might be required.

2309. Whom do you mean by all?—All the mechanics; the head of the mechanics, the head of the property department, the head carpenter, and the gas engineer.

2310. It has been suggested that it would be a good thing in a theatre always to have men in uniform, so that people might know whom to obey; do you approve of that suggestion?—Yes. I think myself it is a very wise suggestion,

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suggestion, though I am pleased to say that under my present arrangements, and I have been 22 years in two of nearly the largest theatres in London, I have always escaped accident.

2311. You have not men in uniform, have you?—I have not. I do not say that I should object to it if it were so ordered; on the contrary, I do not see any objection to it at all.

2312. Are your workshops above the stage in either of your theatres?—Our workshops are at the extreme back of the stage.

2313. Are there none above?—There are none above.

2314. With regard to the nature of the buildings which surround your theatre, do they contain, as far as you are aware, any particularly inflammable matter?—None that I am aware of.

2315. Do you approve of all the regulations which have been laid down by the Lord Chamberlain?—They have worked very efficaciously, as far as I am aware. They are very stringent.

2316. And you act up to them?—I do, to the best of my ability.

2317. There is not one theatre which you know of where they do not carry them out?—None that I am aware of.

2318. Do I understand that you carefully obey those regulations?—I obey them as carefully as I possibly can. I am not aware that any of those regulations are not carried out in my theatres.

2319. Supposing the Lord Chamberlain were to recommend some change, the proper mode would be for you to communicate your objections to him, if you had any?—Undoubtedly. I am very pleased to say that his suggestions, although I must candidly confess that they have been very expensive during my career, have been very wise and very just, and I have carried them out; but I must say that, in so doing, the greater portion of my income has been expended in those alterations. If there was anything which I objected to that I thought was not right or proper, I should raise my objections, and I have no doubt my objections would be listened to.

2320. Can you speak from your own experience regarding the management of other theatres in which you have no interest?—No, I would rather not. I have not had much experience in other theatres. I have managed the City of London, the Victoria, and the Marylebone theatres, for short times.

2321. I asked you that because I wished to ask this question, and I do not think you need answer it unless you see fit; are you aware that the proprietors of theatres in the east of London always do their best to carry out the regulations of the Lord Chamberlain?—I have always heard so, and I honestly believe that they do.

2322. You say that your main object in case of an alarm of fire is to keep the people in the theatre, but is it not the natural impulse of humanity that when an alarm of fire is created a person should desire to leave the precincts of the place immediately?—No doubt; but it is for the officers employed to keep them back and only let them stream out in such numbers as can clear the passage; a block in the passage would be a most serious thing; that is to say, if they got blocked in the passage, and could not possibly stream on, because the people at the back would still push forward, they would not know that the people in front were blocked; it is quite impossible that an audience in a theatre can all get out at one moment, and that is what you observed, and very justly observed, they would try to do.

2323. Would you not call sofas and chairs in the passage a block?—Yes, undoubtedly I would.

2324. Therefore I do not understand your reason not only for not objecting, but for not objecting very strongly to them?—I think this is the first time I have heard of sofas having been placed in gangways, but at all events I do not think it would be so objectionable as has been suggested; if the stalls were seated with these moveable chairs, I can well understand they would prove an impediment and a very serious one, in the case of a rush; but I do not put the great weight upon chairs that some people do, having undergone a panic some two or three times. I might of course differ if I went through a panic again, but I do not think I should; if I had a panic I should try with all the means at my command to stem the tide of people rushing out.

2325. Have you any chairs in your theatre?—We have not.

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2326. You get notice from the Lord Chamberlain's office when there is an inspection about to take place, do you not?—Yes, as a rule.

2327. That inspection is always by day?—It is always by day; there has been an inspection since the late calamity at night, that is to say, the officials of the Lord Chamberlain come down to see that the doors were properly kept, and so on.

2328. *Chairman.*] Was that during the pantomime season?—Yes.

2329. Mr. *Onslow.*] Do not you think that an inspection by night during the performance when the gas is on, and when the theatre is crowded with people, would be of more use than on inspection by day?—I do not see any objection to it at all.

2330. It is your opinion that proprietors of theatres would not object to have a night inspection without notice?—Individually I may say I should not, and I do not see how anyone possibly could.

2331. Without notice?—Without notice.

2332. Sir *Henry Peek.*] I think you stated that you obtained your license from the Lord Chamberlain only?—Yes, from the Lord Chamberlain only.

2333. When once you have got a license there is no one to interfere with you; neither district surveyor nor anybody else?—There is the yearly inspection.

2334. But no other authority than the Lord Chamberlain?—Unless there is some structural alteration made; then the district surveyor comes in.

2335. You stated that some of those orders were very stringent and expensive to carry out?—Yes.

2336. And that you had always cheerfully obeyed them?—To the best of my ability.

2337. Suppose some other manager did not obey them, what then?—I presume when the year came round, and he required his license renewed, it would be refused. I suppose that punishment would be quite sufficient to make him obey in future.

2338. But might not that punishment be out of all proportion to the offence?—It might be rather strong, I confess; but you put the question to me if a manager did not obey what condition would he be in. I say he would run the risk of losing his license.

2339. But what I say is this, that if the punishment be out of proportion to the offence that deprives the Lord Chamberlain of any power at all, because he would not like to inflict a punishment out of all proportion to the offence?—No doubt.

2340. Suppose the Lord Chamberlain had a modified power, and if he were to say, Mr. Manager you have not chosen to obey my orders, I will close your theatre for a fortnight or a month, do not you think that would give the Lord Chamberlain a wholesome power in the matter?—I do; but I think managers should have a little voice in the matter likewise. There might be a difference of opinion between the manager and the Lord Chamberlain's official, and I think there should be the same mode of investigating that difference of opinion before the stringent use of that power should be put into force, namely, closing a theatre for a month, for that, in my way of thinking, would almost in any theatre of the present time spell ruin.

2341. But if the Lord Chamberlain were to come to you and say, Mr. Abrahams you have thought proper to disobey one of my orders on the ground that you think it too stringent; the next licensing day you will come for a renewal of your license, and will go without it, that would be more stringent than saying, We must make an example of somebody in order that our rules shall be obeyed in future. We will close the East London Theatre for a fortnight; that would be a severe punishment upon you as proprietor of the theatre, but still it would not be out of all proportion to the offence?—Undoubtedly.

2342. Therefore do you not think it will be desirable to give the Lord Chamberlain that modified power?—I do not think it would be unwise; but from my experience of the Lord Chamberlain I do not think he would offer any suggestion but what was moderately wise and just. Still I think a division of opinion might arise between the Lord Chamberlain and a manager; that the manager's opinion

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opinion might be right, and that the Lord Chamberlain's might be wrong, and I think there should be some power of appeal given to managers.

2343. Is there none at present?—None at all.

2344. The manager would not be placed in a worse position by power being given to the Lord Chamberlain to suspend the license for a fortnight or a month?—He could not possibly be in a worse position than he is in at the present time, the Lord Chamberlain having absolute power to close a theatre if he thought fit, not that I think he would do it.

2345. But as a practical man you would see no objection, if such a power as that were given to the Lord Chamberlain?—No, I think it would be well used.

2346. Mr. *Clifton.*] You stated that at one time at your theatre, the Pavilion, there was a panic caused by the adjoining building being on fire?—Yes.

2347. I think you stated that the fire covered the whole front of the theatre?—The front entrance.

2348. I suppose you will agree that theatres should have two distinct exits; that is to say, two exits not on the same plans of the building?—That is so; there is no possible doubt about that.

2349. We have heard that some theatres have three or four exits, but that they are all in the same line of street?—I have heard so.

2350. You have also stated that you object to the fire-plug being in front of the theatre?—I stated my reason for that objection.

2351. Do you think that the fact of its being in front of the theatre would interfere with the exit of the audience?—No; I think that if the engines drew up to the front of the theatre, and began to play as they have done, as I have before told you on a certain occasion, it would be most likely to cause a panic in the theatre, though there would be no real cause of alarm.

2352. But at the same time do not you think that the arrival of the engine would rather impede the audience coming out?—No, not at all; the word "fire" has only to be used in a theatre, and there would not be much difficulty in getting away; the general public do not give much consideration to where the fire is; there is no theatre with any modern appliances at the present time, but where the audience could get out perfectly easily if they would only leave the theatre in a quiet manner, but they do not do that; they are panic-stricken, and I think it is only those persons who have experienced a panic in a theatre who can form the remotest idea of what a panic is.

2353. You think that the theatre would be emptied before the fire-engine arrived?—I did not put it in that way; I merely wished to imply that a fire-plug being in the centre of the principal entrance, and an engine beginning to play, might alarm the audience, and cause a panic.

2354. I do not think you understand what I mean. What I mean is, that having a fire-plug exactly in the centre of the exit, the audience would interfere with the engine, and the fire-engine would interfere with the audience coming out?—I do not say that.

2355. I think in the case of the Brooklyn Theatre there was a considerable loss of life owing to the balusters giving way; is there any rule in the Lord Chamberlain's regulations that the balusters should go from the roof to the floor?—Yes, I think there is, and I believe our theatres are built in accordance with those rules, with fire-proof staircases, and if that had been carried out in the Brooklyn Theatre, as I am told, no accident would have occurred, as far as human forethought can foresee. It was the falling in of the staircases that caused the loss of life, and I do not think that would be very likely to occur in a modern built theatre.

2356. With regard to the inspection of theatres, do you see any reason why the managers should not pay upon a certain scale of fees to pay for the inspection of those theatres?—I am free to confess that the expenses are quite heavy enough at the present time, but I do not think there would be any serious objection to that.

2357. You do not think it would be fair to call on the ratepayers to pay for the inspoction of your theatre?—If the district surveyor had to survey the theatres in his district, I do not think the expense would be much, but I quite think that the ratepayers would object to having the extra impost placed upon them,

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them, and I do not think the managers would object to the little extra expense.

2358. Do not you think that the surveyor of a theatre should be a perfectly independent person from the person employed by the Lord Chamberlain?—I do not; I think the district surveyor would be the right and proper man, from the simple fact that if it is a modern theatre it must have been built under his supervision, and he must know the arrangements of the theatre from basement to roof very much better than an independent surveyor could do; and if it is an alteration, no alteration can take place unless the district surveyor is made aware of it.

2359. You do not see any objection that the man who surveys on the part of the Lord Chamberlain, should be the same man as the man who makes alterations for the manager of the theatre?—I would not go so far as that; I would go so far as to say that in my opinion the district surveyor is the right and proper man as the local authority to survey a theatre.

2360. Do you know any case in which the Lord Chamberlain's surveyor is the same individual as the man who has made the alterations in the theatre?—Yes, I have known it; it is very natural that a proprietor should call upon the Lord Chamberlain's surveyor, if he could obtain that gentleman's ability and knowledge; that is the very man that a manager, when he was making an alteration or building a new theatre, would fall back upon, thinking that he would have greater experience than an ordinary surveyor.

2361. Mr. *Hayter.*] Do you agree with the evidence of Mr. Ponsonby Fane and the other evidence which has been given before this Committee, that the real danger to an audience in any theatre arises from panic amongst themselves?—I do.

2362. That that is the principal cause of accidents?—That is the principal cause of the accidents which occur; my impression is that what managers have more particularly to guard against, or to try and prevent, is panic.

2363. Of course that is principally to be obviated by the width of the passages and the number of exits?—I do not think it can be totally obviated, do what you may, but still it can to a very large extent be obviated by the passages and other exits being as near to the street as you can get them; the more exits you have the better you can get your audience out, but to say you can totally obviate panic, I do not believe.

2364. Is the annual inspection of the Lord Chamberlain's department principally directed to those points?—It is directed to all points, structural and other points; I do not think there are many things under his control which are not well looked to at the time of the inspection.

2365. The Lord Chamberlain's inspection comprises water supply, arrangements in case of fire, passages, and the exits?—Yes.

2366. In fact you think the investigation very thorough?—For the time being, it undoubtedly is.

2367. Have you had any difficulty in insuring your theatres?—Not at all.

2368. Are they both insured?—They are.

2369. And are theatres, as a rule, to your knowledge insured?—I have never heard of one that has not been insured. There will be difficulty arising at times, from some theatres being not so well provided as the modern theatres may be, and no doubt that would make an alteration in the rate.

2370. Without the modern appliances, the insurance companies would probably refuse them I imagine?—They would put a higher rate upon them than they would otherwise do.

2371. You know of no London theatre which is not insured?—I have never heard of one.

2372. Mr. *M'Lagan.*] Have you never heard of any theatre within the last 20 years that was not insured?—I have not heard of them, but there might be some.

2373. Since you have introduced these improvements for the extinction of fires in theatres, have you had to pay the same rate to the insurance companies?—No; I think the insurance of the Pavilion Theatre at the present time is half-a-guinea in 100 *l.* less, but the East London Theatre has been in my possession for 22 years, and I have not made any alteration; the insurance of the Pavilion has been three guineas, but it is now two-and-a-half guineas, from the hydrants and other things being placed in it, and I believe that if I were to make an application

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plication to the office I have been dealing with for 20 years they would lower the rate, but I have never thought it worth while to do so.

2374. I understood you to say that the arrangements you make for the extinction of fire in your theatres are a very good measure of the risk of danger to the audience?—No doubt of it.

2375. Are you aware that the fire insurance companies will very often insist on hydrants being placed and other measures adopted before they will insure?—The fire insurance offices take the precaution of surveying a theatre before they insure it.

2376. And that the managers of theatres will get their theatres insured at a lower rate if they conform to certain conditions laid down by the insurance companies?—I believe that is so.

2377. I believe all the doors open outwards?—That is the case.

2378. The Committee have had evidence with regard to the difficulty arising from chairs being placed in passages. I think we should be put right on that point. I will give you my idea of what has been stated. You state that the great danger to the audience in the theatre is panic amongst themselves, and anything that will tend to allay that panic will make that danger less of course. The effect of a panic is to cause a great rush to the doors, and anything that will prevent a rush is so much to the advantage of the audience; if you put a man at the door to prevent a rush that would make the danger less, and you suppose that chairs being there instead of a man have the same effect; is that your view?—I do not go so far as that. I simply go so far as to say that although I consider chairs would be a serious impediment, I do not place that serious construction upon a few chairs which may obstruct the passages within the theatre that some people may. I did not say that they would facilitate the exit of the audience.

2379. When a panic occurred what precaution did you take to prevent the rush to the exits?—Simply to give the audience to understand from the stage that there was no danger, and that whatever danger there might be they could make their exit comfortably in plenty of time, and by placing attendants at the doors to keep the audience back and not allow the passages to be blocked.

2380. I suppose that the principal precaution which you can take in a case of that kind is to place your men along the passages, so as not to allow them to be blocked?—Quite so.

2381. Therefore it would be necessary always to have a sufficient number of men about a theatre to enable you to do so?—There are always the check-takers and the money-takers, and those are the men I should look to to do this; those are the men who would be aware of what was necessary. They have done it before, and they would do it again. It is very seldom I change my men, very seldom indeed.

2382. A fire or panic occasionally occurs about once in 10 years. Do you take any steps for teaching those men what their duties would be in such cases?—I very seldom change my men. I think I have hardly changed any of my men within seven years, but any man being taken on would be immediately taught his duties.

2383. You never put your men through any drill which would occupy half-an-hour every now and then?—We have what we call rushes in the minor theatres, that is people coming out in large numbers between the acts, and I think that is an excellent training for those men.

2384. And you find that every man is at his station?—I find that every man is at his station; I have been very fortunate hitherto. I am not immaculate, but I trust I may be as fortunate in the future. You can only say in a panic that you will do your duty, and after you have done that you cannot always say that you will be as free from accidents as I have fortunately been.

2385. But in rushes people lose their heads; that is to say the officials?—Not in my case; if it had been so in my house you may be sure that some loss of life would have occurred.

2386. You think well-trained officials are superior to any mechanical contrivances that you can have?—I think good mechanical contrivances are also necessary.

2387. You must have good mechanical contrivances, but unless you have trained heads to take advantage of those mechanical contrivances they are of no

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use?--You will not get on so well; but still I believe that the mechanical contrivances are just as necessary as the men.

2388. From what you have stated I believe it is your opinion that the greater the interference of the public authorities, that is to say the public authorities represented by the Lord Chamberlain, the less your responsibility becomes?—I do not know that any of the responsibility would be taken from the shoulders of the manager; but the manager cannot always be in the establishment, and it might happen that something might occur which would show a laxity on the part of those whom he left in charge, and it would ease the mind of the manager to know that things could not possible go far wrong in consequence of the surveyor, or whatever he might be termed, being there twice a week to see that things were going on rightly.

2389. It would ease his mind; that is to say, it would render him a little more careless?—I do not admit that.

2390. If a manager knew that another man was performing the duties which he ought to perform, do not you think that would make him a little more careless?—No, I do not think that an inspector going round two or three times a week would render a manager careless, from the simple fact that if things were out of order he would be reported, and I would cause my men to take very good care that everything should be in order.

2391. You think that the responsibility of a manager of a theatre would be quite the same whether his theatre were inspected once a week or once a year?—The responsibility is very great. I can only tell you that after that accident I spoke of, my business fell off 50 per cent. and I did not pull it up for two months. I think it must be obvious to you that a manager must have a great deal at stake inducing him to keep his house in order to prevent that which we are all anxious to prevent, namely, panic.

2392. You stated that at the present time there is no appeal from the Lord Chamberlain's decision?—None that I am aware of.

2393. Is it necessary that there should be any appeal?—I am perfectly satisfied to remain under the rules of the Lord Chamberlain as they are at the present time.

2394. You can only be punished if you disobey the instructions which are laid down?—That is so.

2395. And those instructions are so very plain that it is very easy for the Lord Chamberlain to interpret them without requiring any appeal from his decision?—I do not object to the Lord Chamberlain's mode of proceeding at present at all.

2396. I wish to put to you one more question as to the inspection and the responsibility of managers of theatres; do you think that the theatres of London are sufficiently often inspected just now?—I do not know that further inspection would do any harm, but I think the managers have so much at stake that they would take very good care that everything was in perfect order.

2397. Supposing there were more frequent inspection you would still consider that the responsibility of the managers was the same?—Yes, I would.

2398. *Chairman.*] What I understand you to say is, that you do not think that it would remove the responsibility in the least from the managers to have more frequent inspection; but that it would really strengthen your own hands, because you would feel that other eyes besides yours were looking after the safety of the theatre?—That is so.

2399. Then I understood you to state just now that you were satisfied with the inspection and the regulations of the Lord Chamberlain?—Perfectly.

2400. But, as you stated before, you would not object to the inspection *qua* construction being placed in the hands of district surveyors or the Metropolitan Board of Works?—I think that would be an excellent change.

2401. And though you were not prepared to give an answer upon that, you do not say you would object to the regulations of the present Lord Chamberlain which he at present lays down or which he might lay down in the future, being enforced by some other means less stringent than the taking away of the license?—What I mean to say is that I would very much rather see the rules before I would assent to them. I should not like to say that I should be glad to work under certain rules until I saw them.

2402. That amounts to this, that you are prepared to submit to the present power

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power and the present rules of the Lord Chamberlain, whilst the present power of punishment is one which the Lord Chamberlain hardly permits him to enforce? —I do not think he would enforce that penalty unless he were compelled to do so.

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2403. As you would trust him in the larger matter, you might also trust him in the smaller matter?—It would require consideration.

2404. Mr. *M'Lagan* (through the *Chairman*).] Are the partitions in your theatre, which you have stated are fireproof, made fireproof by arches, or by some such composition as concrete?—We have very few partitions I think I have only one partition in the Pavilion Theatre, and I do not know of one in the East London Theatre.

2405. When you spoke of the fireproof part of your building, it related to the passages which lead to the theatre, and to the brick wall which separated your stage from the auditorium? —They are all brick.

2406. There is no iron in them?—I do not know that there is any iron in them.

Mr. *John Hollingshead*, called in; and Examined.

2407. *Chairman.*] I BELIEVE you are the Lessee of the Gaiety Theatre?—I am.

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2408. You remember I daresay the Committee of 1866?—I gave evidence upon that Committee.

2409. In that evidence I see you stated that the existing power of the Lord Chamberlain with regard to the construction of theatres might be amended? —I believe so. I have not refreshed my memory with regard to that evidence.

2410. Upon that point you have heard what has been given in evidence to this Committee with reference to a suggestion from the Lord Chamberlain's Office that the whole system of survey with regard to the construction of theatres, either in the case of alteration of old ones or the building of new ones, should be placed under different authority than his own; do you think that would be an improvement or otherwise upon the existing system?—I think it would be an improvement certainly, and I think that that survey ought to be made to include the music halls and concert halls in London, which are in their holding capacity in the proportion of two to one of the theatres. They are at present licensed by the magistrates, and are never surveyed by any authority.

2411. That if a new authority, either under the Metropolitan Board of Works, or as Mr. Ponsonby Fane suggested, under a department of Government, for the purpose of inspecting *qua* construction were established, that ought to apply to all places of amusement where people assembled, whether music halls or concert halls?—Quite so; music and concert halls in London only can accommodate daily 160,000, and the theatres under the Lord Chamberlain only accommodate nightly 80,000 people; and in numbers the music halls as compared with the theatres are nearly two to one.

2412. The necessity for protection applies as much to the one as to the other? —Yes.

2413. Would you make any distinction in the case of music and dancing licenses, because it has been pointed out to this Committee that it would be very difficult to require inspection for construction in public-houses where 40 or 50 people came together which had acquired a music license?—Those small places are very few; there are not above six or seven, or perhaps a dozen, in London. Most of the music-halls hold from 500 to 5,000 people.

2414. But Mr. Pownall, who was one of the magistrates of the Middlesex Bench, and who gave evidence the other day, stated to the Committee that by far the largest number of music licenses applied for were not for music and dancing combined, but merely music licenses taken out for small public-houses where they had a room in which 20 or 30 people came together for the purpose of listening to songs?—Mr. Pownall speaks, or ought to speak, with greater knowledge on the subject than I do, but I know that music licenses have been

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granted to at least 50 very large halls, and that a dancing license has been refused to many of those halls; like Weston's, for example, which will accommodate over 1,000 people.

2415. And the difficulty might be got over by limiting the inspection, as far as construction is concerned, to places where more than a certain number of people were admitted?—Quite so; the construction of music-halls is generally more simple than that of theatres, because they generally consist of an oblong open floor and one gallery, and in very few cases have they anything like inflammable scenery or elaborate gas arrangements, but on the other hand, the chance of fire is equally great or greater than in a theatre, because probably half of the audience are all the time smoking.

2416. And of course the construction, as far as the staircases and passages are concerned, would apply quite as much in that case as in a theatre?—Quite as much.

2417. Therefore you would recommend that in any alteration they should all be brought under one survey?—Under one harmonious system of survey.

2418. Would you recommend that the license should be under the same authority, or would you leave the music halls to the magistrates, as at present, and place the theatres under the Lord Chamberlain, making it obligatory upon the magistrates and upon the Lord Chamberlain to issue licenses on the certificate of construction?—My objection to these licensing bodies is that the Lord Chamberlain is a Crown officer not responsible to Parliament, and the magistrates are not responsible to anybody except to public opinion.

2419. What more would you suggest?—It has been suggested that these matters should be given to a department of the Board of Trade or the Home Office. Certainly some competent person should survey places of amusement, because music halls and concert rooms are not surveyed, except when a magistrate sometimes drops in, whereas the theatres are surveyed by a very competent man, who receives a guinea, I think, every time he goes round, but who has other duties to attend to.

2420. What you represent is, that it should be in the hands of some responsible authority?—Yes, certainly.

2421. When you say "placed in the hands of some responsible authority," would you place the license which implies, in the case of theatres, compliance with the regulations which the Lord Chamberlain now issues, or which in the case of music halls implies good conduct, in the hands of the Lord Chamberlain, or the magistrates, or would you suggest a new licensing authority as well as a new surveying authority?—I think the licensing ought to go with the surveying authority. I think Lord Sidney, in his evidence before the former Committee, said he should be very glad to see the survey of theatres severed from the Lord Chamberlain's office.

2422. That is the evidence the Committee have now from Mr. Ponsonby Fane, but it is limited in both cases to the question of survey; in both cases Lord Sidney and Mr. Ponsonby Fane suggested that as soon as the survey has taken place, and a certificate is given, then the manager with that certificate in his hand should come to the Lord Chamberlain (and Mr. Ponsonby Fane says, to the magistrates in the case of music halls) and apply for a license to issue, but that the licensing power should remain as it is, in the magistrates and Lord Chamberlain's hands; do you see any objection to that, supposing the constructing part, and the survey part, were taken out of their hands and placed in the new authority?—I confess I should like to see one central authority governing the whole of the places of amusement.

2423-4. That would then almost lead to this, that you would prefer strengthening the Lord Chamberlain's department by a sufficient official staff responsible to Parliament which should deal with the whole question of music halls and theatres?—Certainly; there are two great theatres in London, Drury Lane and Covent Garden, over which the Lord Chamberlain has no control; Covent Garden is, and Drury Lane claims to be, a patent theatre; they allow the Lord Chamberlain to enter by courtesy, but he has no right to claim it.

2425. Then with regard to the question of construction, I suppose the principal safety which ought to be enforced is a given number of exits, with distinct passages leading to them from different parts of the auditory?—Unquestionably.

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2426. Have there been any suggestions made with regard to the Gaiety, since you have been lessee, upon these points?—Yes; a suggestion was made by the Lord Chamberlain that an alternative stone staircase rarely used should be under-pinned by iron girders; the value of that suggestion is, in my opinion, considerably diminished by Captain Shaw's statement and opinion, that he objects to iron and stone as being dangerous. The magistrates, for example, in Belfast, would not license a place with other than oak staircases.

2427. Do you think that should be a matter that should be decided?—I think that the authorities ought to settle among themselves what material should be used.

2428. I believe it is generally known that under great heat the iron twists and pulls down that which it is intended to support?—I believe so, but I cannot speak with authority upon that subject.

2429. What number of doors have you?—We have 20 doors communicating with six stone staircases; we had an inspection the other night when the Lord Chamberlain's officials were there, and 1,100 people went out in three-and-a-half minutes.

2430. That was upon an ordinary night when people had to wait for their carriages, and to be taken up?—Yes

2431. That would show that when there was any alarm, in which case people would wish to get out as quickly as they could, you could even empty the theatre more rapidly than that?—In two minutes I should think, supposing they did not tumble over each other.

2432. I suppose you agree that the great thing you have to guard against is a panic, and the crush that ensues from it; now you have stated the number of doors, are the passages which lead to them long passages?—No, they are very short passages, with the exception of the long main passage which commences at the head of what we call the grand staircase in the Strand; that leads into the theatre, which is some distance from the Strand; the theatre itself opens into four streets.

2433. Do all these passages tend to the same entrance?—No, they are separate; the theatre opens into four streets, and the six staircases are divided between the four streets; if those 20 doors were all used some of them would converge on to one staircase; they are not necessary to be used.

2434. Are all those doors used every evening when the performance is on?—No, in the dress circle there are six doors which would communicate with four staircases, but only one practically is used, that is the grand doorway.

2435. Is any precaution taken to make the audience acquainted with their position?—Yes, notices are placed up: "This door to be used in case of necessity." We always like to avoid the use of the word fire, a great source of danger being in the word alone.

2436. But you do not see the advantage of using the doors on an ordinary occasion so as to accustom the people to the use of these exits?—I do not think it would be a bad plan to accustom them, except that the audience of one night is not the audience of another night.

2437. But still the using of these doors would diminish the chance of panic, because the people would use the door that was nearest, and not all run to the same door?—Quite so; there is a great tendency, however, on the part of the public to go out the way they came in, that is the way they know; a rush would always be made in case of a panic for that door.

2438. Then with regard to the construction of the Gaiety Theatre, are you acquainted with the construction of it?—I had it built for me.

2439. Is it built with a proscenium wall separating the stage from the audience?—It is a 14-inch wall.

2440. That is the thickness which Mr. Robinson recommended in his evidence?—Yes; it is carried up four feet above the roof.

2441. So that it is a distinct partition?—Yes; that wall was built before Mr. Robinson was consulting surveyor to the Lord Chamberlain.

2442. Are the passages which lead to where the staircases are of fire-proof construction?—They are all made of concrete and brick, and supposed to be fire-proof. The stone stairs are of fair widths. I can give the Committee the details if they wish.

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2443. I should be glad if you would give to the Committee the widths of the passages, and whether those widths vary?—The stalls accommodate 120 persons, and the boxes on that level 22 persons. There is one door directly into Exeter-street 4 feet 6 inches wide, and another into the Strand with a passage 9 feet wide; and there is a stone staircase leading to the stage, and from there to the stage-door, making three exits to that level. The pit holds 300 people. There is a passage direct into Catherine-street with a door 6 feet 6 inches wide. Then there is the pass-door into Exeter-street, and, in case of panic, they could use the main entrance in the Strand as well; a little short door, the barrier between the stalls and the pit, could be opened, and they could come into the main staircase. The balcony holds 175 persons, and the boxes on that tier hold 44 persons; the entrance and passage are 9 feet wide, and the stone staircase 7 feet. There are three other doors communicating with the stone stairs. The upper boxes hold 250 persons, with a passage 9 feet wide and stone stairs 7 feet; there are extra stone stairs at each end, and three other doors communicating with stone stairs. The gallery, which is called in the bill gallery and amphitheatre (there is a division of prices up there, but it is practically all gallery), holds 450 persons; leading from that are stone stairs entirely separated from the house, 7 feet wide, opening into Catherine-street; also extra stone stairs at each end of the gallery; the whole of the stairs are stone, and all the passages and lobbies are iron and concrete. This evidence may seem a little tedious, but it is very important, because this is supposed to be a model theatre, and is insured at a less price per cent. than any other; the floor of the pit, the upper boxes, and gallery, is also iron and concrete.

2444. Is the iron which is mixed with the concrete covered with concrete, or is the iron exposed?—The concrete covers the iron. I do not know the depth of it exactly.

2445. I asked the question because it materially affects the question as to the application of heat to the iron?—The iron is covered with concrete; there are two fire mains in prominent positions in front of the house, with hose always attached with a constant supply of water at high pressure, and there are also hydrants with hose always attached at each side of the stage and in the flies, and the hose can be let into the mezzanine and cellars through holes cut in the stage; the great force of the pipes is always kept on the stage, because that is where they are most likely to be wanted, and they are let into the lower parts if necessary. The proscenium wall which goes up each side is arched over the proscenium, and is carried up four feet above the level of the roof, and is 14 inches thick. The total holding capacity of the house according to these figures is 1,395. An audience of about 1,100 people went out of the auditorium on, I think, the 12th April under 3½ minutes.

2446. How long has that theatre been constructed?—Eight years last Christmas.

2447. And it is in consequence of the construction of that theatre that the insurance companies accept it at a lower risk than other theatres?—Yes; the insurance is based upon that fact, and partly I suppose on account of the care of the management.

2448. That being the construction and form of the theatre, and the security which you represent is given to the public in the theatre from it, you think that such construction is of advantage, and might be enforced by the authority which you have suggested should be set up in all new theatres?—I think so.

2449. And that the same facilities should be made a part of the construction of all new theatres?—Quite so; it is not always easy to get exits into four streets; land is very valuable in choice parts of London, and theatres are very often built in the middle of a nest of houses, with narrow entrances coming into the main street.

2450. But that difficulty might be met by keeping separate passages leading up to the doors for separate parts of the audience, even though they may have to go out at doors ultimately upon the same plane?—Quite so; and in most theatres they manage to get an egress up a side court.

2451. One of the great advantages in the construction of passages is that they should increase in size towards the door, and not towards the theatre?—Quite so.

2452. You

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2452. You are acquainted with the regulations laid down by the Lord Chamberlain's office, are you not?—I am.

2453. Mr. Ponsonby Fane stated that he thought it would be a great advantage if what I asked the last witness could be enforced; that is to say, that these regulations, or regulations laid down by the licensing authority, could be enforced by penalties, instead of having the only penalty which now exists, namely, the removal of the license; do you see any objection to that plan being adopted?—I think if the Lord Chamberlain's authority is to exist, it should be made as perfect as possible, and that he should have funds to prosecute, and officers to prosecute.

2454. And that the right of the removal of a license should not be his only weapon in dealing with an infringement of the regulations?—I think so, because that is inoperative in the case of Drury Lane and Covent Garden. The Lord Chamberlain cannot threaten the manager of a patent theatre with the loss of his license in case of an infringement of a regulation, because he could not destroy a license that lasts in theory for ever.

2455. And if that were to be acted upon, it would operate upon a large number of innocent people, as it would throw them out of employment?—It is practically a punishment which the Lord Chamberlain would not resort to under almost any circumstances.

2456. But you think that if a new authority was set up power should be given to enforce any regulations which might be necessary?—Certainly.

2457. I think you have been recently in Paris, have you not?—Not very recently, but I know the French theatres tolerably well.

2458. What is the method of licensing theatres in France?—The regulation of the French theatres is practically in the hands of the French fire brigade, the *sapeurs-pompiers*. The chief of the *sapeurs-pompiers* is really the stage director, and the effect of that is that all your stage effects in Paris are cramped more or less. My chief experience in connection with the French stage was at the old Porte St. Martin some years ago; I sold a very large fairy scene to the directors of that theatre, and sent a number of men over to work it, but we could never get it properly lighted or set up. Whenever they attempted to light it properly they were threatened with so many thousand francs fine and so many years at the galleys. The consequence was that the artist, an eminent man, Mr. Callcott, left Paris indignant, and a few days afterwards the chief part of the scene, which was composed of a very large number of pieces of glass, fell upon the stage and caused a panic in the auditorium by scattering an enormous number of splinters of glass about.

2459. The result of handing over the theatres to the *sapeurs-pompiers* is not satisfactory on that ground, and is not satisfactory on any ground, because it divides the responsibility?—It cramps the director in the management of his theatre, and does not diminish the risk of fire; the old Opera House in the Rue Lepelletier was burnt down a few years ago, for the fourth time, and at the time of the fire there were 14 *sapeurs-pompiers* at their posts, and all ready, but the theatre was burnt all the same.

2460. You do not think that any suggestion to entrust as in Paris the management of theatres to the fire brigade here, would produce greater security from fire or protection?—I do not think there are any more admirable men than the fire brigade when under Captain Shaw, but if they are told off by twos to theatres they very soon become disorganised; they do not obey the manager; they very seldom see their chief, and they are exposed to all kinds of temptations, I do not say upon the stage, but temptations in the front of the house, at the drinking bars, which are in my opinion far too numerous.

2461. You think that protection from fire is more secured by trusting it to the responsible manager and the people he employs?—I think the firemen of the theatre are more efficient than Captain Shaw's men are for the purpose, because they are under the orders of the manager, and he can discharge them if they do not obey him.

2462. They are properly drilled and they are more useful than one man who is stationed near a hose?—Yes; there is always one man called the fireman attached to a theatre, and it is his special duty to watch the place at night, and to look after the water arrangements and prepare them every night. When the curtain goes down the hydrants are put upon the stage ready for use.

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2463. Are the music halls in Paris under the same system as the theatres?—I do not know what the licensing authority in Paris is; it is a Government authority, but I cannot say what it is exactly.

2464. Do you know whether there is any system of inspection for construction there before the license is granted?—I should fancy there is, but I do not know exactly.

2465. Are you aware that in the French theatres they use an iron curtain to separate the audience from the stage?—In one theatre I think they do; but it is not strictly an iron curtain; it is a wire gauze curtain; the iron curtain, properly so called, originated in America, and was tried and behaved so badly in the case of a fire there (I cannot give the exact instance), that it was abandoned; it buckled up, and was worse than nothing at all.

2466. The Committee were told by one witness that in the French theatres it was obligatory to have this curtain made of uninflammable material, such as wire gauze?—It may be a new regulation. I know at the new opera they have one, if not two, of those curtains.

2467. Have you seen the working of a wire-gauze curtain?—No.

2468. So that you could not say whether you think it would be a security or otherwise?—It is a simple matter; it will come down, I suppose, like a blind.

2469. The object would be, as a fire generally originates on the stage, to check it from rushing with the draught which there is on the stage to the auditorium, where the heat is greater?—That is so, but as far as our experience in England goes, a fire rarely occurs in a theatre while the performance is going on, for the reason that during the time the performance is going on every square yard of the stage practically is peopled by some workmen or actor who would see the origin of the fire, and would stamp it out with his foot, as you would stamp out a fusee on fire.

2470. Or, as Mr. Ponsonby Fane said, with his cap?—Yes, and that accounts for the fact that whereas in the last 50 years 22 theatres have been burnt down, there has not been one loss of life by fire. The only person killed was a maid servant of Ducrow's, at Astley's, who need not have been killed if she had not gone back to find some article of apparel, and who was suffocated at the foot of the stairs in the Westminster Bridge-road, and she was not a member of the audience, but of the company.

2471. And during the last 30 years there has not been a fire during the performance?—I do not think there has.

2472. Would you see any objection, supposing the regulations were allowed to be enforced, to a more frequent inspection of theatres?—None whatever.

2473. That is to say, it would be necessary to inspect, to see if those regulations were carried out?—I should not object to anything which would make it an efficient survey.

2474. In fact, the interest of the manager is clearly to see that the thing is working, so that there shall be no fire?—Quite so; and I agree with Mr. Abrahams that an efficient survey would take a little of the responsibility off the shoulders of the manager.

2475. It would not remove the absolute responsibility, but it would satisfy the manager, in his own mind, that anything which he had overlooked would probably be detected by the experienced eye of the inspector?—Certainly; no man can hold himself responsible for a panic amongst the audience, or an accident resulting from it; all he can do is to take care that his theatre shall not burnt down by his own carelessness.

2476. Have you anything further to suggest to the Committee with regard to providing for the security of the public?—Nothing occurs to me, except to have this question of wood *versus* iron, or *versus* iron and stone, settled by the authorities.

2477. You agree with what has been stated to the Committee, that the pillars under the stage should be of wood, rather than of iron or brick?—I would take the opinion of Captain Shaw, or some more practical man than myself; but one set of persons tell me to underpin a stone staircase with iron, and Captain Shaw tells me that iron and stone are the worst materials you can use together.

2478. That would rather point to such a matter as this being placed under the

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the experienced head of the fire brigade with regard to construction in that respect?—Yes; Captain Shaw tried some elaborate experiments a few years ago with pillars of wood 12 inches diameter, and he found that, with any heat he could bring to bear upon them, they would not burn more than two inches deep. These experiments were tried soon after a great fire occurred in the City, and Captain Shaw wrote to the "Times" detailing the experiments. He exposed these wooden columns to the greatest possible amount of heat in a variety of ways, and he could only consume them two inches in depth.

2479. And that satisfied him that wood was preferable to iron?—That satisfied Captain Shaw that wood was preferable to iron; he did not go into the question of stone in that case. I believe his opinion has not been publicly expressed upon that point with regard to stone, but with regard to iron it has.

2480. I think he expressed his opinion that where stone was used, if water was applied the stone would "fly"?—No doubt he is a greater authority upon the matter than most other people.

2481. You think that this matter should be cleared up, and that this authority which was adopted should lay down rules as to the construction of a theatre which would avoid the panic legislation which has placed these iron pillars upon you?—Quite so.

2482. Mr. *Stewart Hardy.*] You say that your theatre is insured at a less premium than any other theatre; what difference do the insurance companies make between your theatre and an ordinary domestic house?—It is in the proportion of about 20 to 1 of ordinary house property.

2483. Your theatre is?—Yes.

2484. And an ordinary theatre?—They go as high as from 30 to 1 to 40 to 1. It may be an interesting fact to cite, that the Brooklyn Theatre fire, which has given rise to this inquiry, has not had any effect upon the minds of the London actuaries; they have not raised the rate in any way.

2485. You stated that the Lord Chamberlain wished you to strengthen these stone staircases with iron, and that Captain Shaw said that iron and stone were the worst materials you could use. Has Captain Shaw said that you should not underpin a stone staircase with iron?—No; the stone staircases have undoubtedly been underpinned in other cases, and the Lord Chamberlain, in justice to the other theatres, when he was going his rounds found this staircase and thought we ought to do something with it.

2486. Did not Captain Shaw say upon the whole that he thought brick preferable to anything?—I cannot answer that question.

2487. I have myself seen wood pillars a good deal thicker than 12 inches burnt through in Canada, though after a good deal of time?—Quite possibly.

2488. *Chairman.*] I believe under the stage they have occasion to remove the supports sometimes?—Sometimes; not the main supports along the mezzanine floor; those are not removed.

2489. Sir *Henry Peek.*] Did I understand you to say that the music halls of London would accommodate two to one of the theatres?—The music halls and concert halls combined; all places of amusement which are not licensed by the Lord Chamberlain, but are licensed by the magistrates; and in the provinces the music halls are in the proportion of three to one; under that head, I include the town-halls and other places which generally are licensed for concerts to the public; there are many such places in London; the Shoreditch Town Hall, for example.

2490. Is there any broad distinction to be drawn between theatres and music halls?—The character of the entertainment as a rule. The music hall is more or less confined to music, but it sometimes infringes the Dramatic Act by playing little duologues and singing performances, which might be considered dramatic performances; one is devoted to singing and dancing without stage accessories, but the other is devoted to the drama with stage accessories.

2491. Some of the halls are very large, are they not?—Some of them are; at some of the largest in London, such as the Canterbury Hall, which is perhaps as large as Drury Lane, there are grand ballets, with all the appliances, the lime light, and so on, which a regular theatre has. Some of the halls are licensed for music and dancing, and some not quite so large, for some reason

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or other, are licensed for music only, and then they are not allowed to give ballets.

2492. As I understand, the theatres are periodically inspected by the Lord Chamberlain; he has authority both as to what pieces shall be performed, and also as to the general condition of the building?—The Lord Chamberlain has authority all over the country, as to what pieces are performed; he licenses the pieces throughout the provinces, though the buildings are licensed by the magistrates. In London also there are six theatres licensed by the magistrates in places which were beyond the boundary when the Act was passed; for instance, the Court, the Bijou, the Cremorne, and the Alexandra Palace theatres; and in the country all the theatres are licensed by the magistrates, except the old patent theatres, but the plays which are performed in them are licensed by the Lord Chamberlain; as much in Liverpool as in London.

2493. The orders of the Lord Chamberlain are not sent to these large music halls, where they do have practically theatrical representations, are they?—These large music halls are, as far as I know, subject to no inspection whatever; the magistrates may go round occasionally to look at the hall and the exits, but they employ no surveyor, and they make no survey; they grant licenses upon a sort of police certificate as to the good conduct of the hall during the past year; the police certificate comes up saying, "We have no complaint to make." The value of that certificate you may take for what it is worth. The same certificate is always handed in with regard to the Argyll Rooms, and the authorities who have thought that London, with its 4,000,000 inhabitants, should have only one Casino, have given Mr. Bignold, the proprietor, a very valuable monopoly.

2494. You think that music halls, casinos, and theatres should be placed under one authority?—I think that music halls, casinos, and theatres should be placed under one authority, and a very effective authority it should be, if you are to have any authority at all.

2495. I asked Mr. Abrahams if he thought power should be given to that one authority, or the Lord Chamberlain, to suspend licenses for periods varying from one week to a month, and not to confine the punishment to the suspension of the license altogether; what is your opinion on that point?—The effect of that would be that a number of innocent people would be thrown out of employment; very often at one large establishment you would have 700 or 800 people all dependent upon the theatre for their bread.

2496. Is not that the present effect of refusing the license?—Yes; but a license is never practically refused.

2497. Then, practically, the Lord Chamberlain has no power of enforcing his regulations?—He never does refuse a license; he did refuse a license to a particular lessee of the Globe Theatre who had caricatured him upon the stage; he said while this gentleman holds this theatre he shall not hold my license, and another gentleman came forward and took the license, but the same gentleman held his interest in the theatre though his name was not upon the bills as sole lessee.

2498. It does seem to me an anomaly that the Lord Chamberlain should have the power to make rules, and yet not have the power of enforcing those rules; does it seem so to you?—It does. Of course the Lord Chamberlain's authority was originally confined to London when it had only two patent theatres, and one or two Royal theatres. Now there are about 53 theatres, including the Crystal Palace; in the metropolis, I question whether the work is not greater than the Lord Chamberlain's department is able to cope with, and it grows every day.

2499. The Lord Chamberlain issues a number of rules and orders. Supposing some manager, who would be altogether contumacious, should say, I do not believe that; and seeing that the Lord Chamberlain has no power to enforce it, I am not going to do it; perhaps he might not say so in so many words, but his course of action would come to that. Now do not you think that if the Lord Chamberlain should say, I do not intend to allow my orders to be set at naught in that way, I will suspend your license for a week, that would be a severe punishment upon the manager, and would deter him from offending again?—Not in all cases; it might be an advantage to the manager, because it might enable him to get rid of an expensive and unsuccessful company.

2500. But would he not have to pay them during the suspension?—The law of

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of the theatre is that if the curtain does not go up you pay no salary; the principle is no play no pay.

2501. *Chairman.*] That, practically, throws the suspension of a license upon a number of innocent people?—Quite so; and I have been explaining to the honourable Baronet that it might come at a time when a manager would be glad to get rid of an expensive company and an oppressive legal liability.

2502. Sir *Henry Peek.*] But one witness stated that the manager could not get the company together again?—You may employ a valuable company for a piece which you think would be successful, and after three nights you may find that instead of making 50 *l.* a night you are losing it, and those people are perhaps engaged for three months, and anything which would cancel the run of the engagement, and stop the theatre, would be very delightful to the manager, though the company might be a very good one, and valuable in other pieces.

2503. But I understand that his authority is practically nil over the theatres, and over music halls much about the same?—So it appears to me; his power of enforcing the regulations is very rarely used. The Lord Chamberlain has no funds to prosecute, and not a sufficient staff of officers to get through the work which is put upon him now by the extension of the theatres and the increase of the London population; that is really what it amounts to.

2504. Mr. *Onslow.*] You have been considering this subject which is before the Committee for many years, have you not?—I have given evidence before Committees, and I have been connected with theatrical matters for 20 years, more or less.

2505. Do not you think it would be advisable that the whole of the theatres in London should be under the orders of the Lord Chamberlain; we have it that at the present time we have only 40 theatres actually under his control, but you have told the Committee that there are 50 theatres in London, therefore there are 10 theatres over which the Lord Chamberlain has no control whatever?—There are two patent theatres; 45 London theatres he has the power of licensing, if they are open, and six the magistrates license; that includes the theatre at the Crystal Palace. I beg to hand in a list which I have made. I have kept this list carefully; I have kept a copy of the Blue Book of 1866, and when a theatre has been destroyed, or burnt down, or opened, I have added or taken away, so that I have got it, I think, very accurately. I include the Crystal Palace and the Alexandra Palace theatres; for this reason, because they are worked from a London theatre. The theatres in those places are not opened by anybody except a London manager. (*The return was handed in.*)

2506. The patent theatres, I understand, are Drury Lane and Covent Garden?—Drury Lane claims to be a patent theatre, having purchased a share of the Covent Garden patent, known as the "Killigrew patent," which dates from Charles II.

2507. You stated something about music halls being turned into theatres and *vice versâ*; can you mention any cases; we have had one mentioned, namely, the Gaiety?—That is not the only one.

2508. *Chairman.*] The original license was for a music hall before the Gaiety was built, was it not?—The Strand Music Hall was bought by Mr. Lawson, the proprietor of the Gaiety Theatre, and entirely pulled down. A lot of property in Exeter-street, which was bought from Lord Exeter, forms the theatre, and the Strand Music Hall now really forms the lobby of the theatre, and not the theatre.

2509. Mr. *Onslow.*] The music halls are now licensed by the magistrates, and theatres by the Lord Chamberlain, and if the magistrates refuse a license to a music hall it is quite on the cards that you might go to the Lord Chamberlain and get a license for a theatre for the same building?—Yes, certainly; the Alhambra did that; it was refused a license from the magistrates for what they considered indecent dancing, Can-can dancing, and the next week the proprietor went for a license for a theatre to the Lord Chamberlain and got it. The Philharmonic at Islington is another case in point. The Oriental at Limehouse is another; it is very common for a music hall to be turned into a theatre with a few structural alterations agreed to by the Lord Chamberlain.

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2510. Is that not rather objectionable in your opinion?—Some people think a theatre is better than a music hall.

2511. I suppose you would agree that all theatres should have an exit at the back and front, or at the front and side; that the whole of the exit at all events should not be on one side of the building?—Certainly I do, if you can get it.

2512-3. Mr. *Onslow.*] I believe you agree that the spirit of the regulations of the Lord Chamberlain is acted up to by the theatres?—I have no doubt of it; the Lord Chamberlain's office maintains a very friendly relation with the managements and the managements with the Lord Chamberlain's office. I do not think there is any disposition on the part of the managers to fly in the face of the regulations of the Lord Chamberlain.

2514. Is it your opinion that for the better protection of theatres a fireman should be always on duty, or that the mechanics and those connected with the stage should have that certain amount of training which would practically do away with the necessity of a fireman?—I think I have anticipated that question by an answer to a question which the honourable Chairman asked me.

2515. Have you had any experience of the method of protecting walls and wood by what is called "stone felt," which has been described to the Committee?—No; I have seen experiments with what is called tungstate of soda on the scenery and dresses, but I have found that to be a failure; it never really bites into the material, but crystalises on the surface and comes off in the form of dust.

2516. What I am referring to was a material for coating walls, called "stone felt," which originally came out as "Brannon's Patent"?—I do not know of it.

2517. You say that in your theatre there is a cellar; is that a cellar in the ordinary acceptance of the word, or is it a place for depositing stage scenery?—It is what is called technically "the cellar;" it is the lowest depth to which we sink the scenery you see upon the stage. The scenery goes down through cuts in the stage, through the mezzanine, and to the cellar floor. I have no scenery stored in the theatre. I have four railway arches which I rent, where I send all my lumber which I do not require to use. I believe that that mode of stowage under the stage is one reason why theatres are burnt down. I do not think theatres are often burnt through the working scenery catching fire, although that is the general impression, but that they are generally burnt down by the property-room workshops and the carpenters' workshops catching fire. In the Princess' Theatre these workshops were placed over the roof, where the heat from the chandelier ascends.

2518. But that is an old theatre?—That is an old theatre.

2519. You would have no objection whatever to there being a night inspection?—None whatever.

2520. Do you think that that would be more efficient than one by day?—I think in some respects it would.

2521. You have heard the evidence, and perhaps read other evidence, as regards obstructions in the passages, by chairs, sofas, and so on. Mr. Abrahams does not seem to attach very much importance to the fact of chairs being put in those passages?—I think that as a matter of justice and comfort to the audience, irrespective of the question of danger, it is not fair to have those obstructions in the passages, and certainly not in the stall passages. What are called extra chairs are a great nuisance to the occupants of the stalls. What Mr. Abrahams meant was that sometimes a barrier is a source of safety; it was considered so in the old days, because I remember in Mr. Macready's time, when I used to pay my 3 *s.* and go to the pit, I have had my life saved two or three times by the sort of pens which then were at the pit entrance, which prevented a rush; you got in about a dozen or 20 at a time, and you were perfectly safe. No pressure could come to you either at side or back, but when the people were let out those barriers were taken away, and they allowed the people to rush out and trample one another to death, but they did not allow them to rush in in that way. I do not think the light chairs which are brought in would make much difference in a panic, because the people would rush over them and break them to pieces.

2522. But they would be very likely to throw people down, would they not?—Yes, they would; but what Mr. Abrahams meant, I think, was that a strong barrier would prevent people from making a rush, and being thereby trampled

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to death. A rush at the Gaiety, for example, at the top of the grand staircase, would not be a very pleasant thing; there are a great many steps to go down into the Strand.

2523. Do you think it would be of any use to have an alarm bell from the stage to the nearest fire-brigade station?—No, I do not think so.

2524. That was recommended by the aldermen after the burning down of the Brooklyn Theatre?—I do not think there would be any objection to it.

2525. The engines would arrive, probably, too late to save the theatre?—When a theatre catches fire I do not think engines will do much good; the fire is either stopped by your own people or it is not stopped at all. The very construction of a theatre is favourable to its being burnt down: it is a sort of blast furnace, and the moment the fire catches hold the engines are very little good.

2526. I suppose you would recommend that such large places as the Egyptian Hall or St. James's Hall should be under the regulations of the Lord Chamberlain?—I think they should be all under one authority, whether it is the Lord Chamberlain, or whoever it may be. I think all those places ought to be under the same authority and subject to the same regulations, because if you have 160,000 people exposed to danger on the same night in the music halls that the 80,000 theatre goers are exposed to danger, and there is no protection for the larger number, while you give every protection to the smaller number, I think it is very unfair to the larger number; but it is a question in which the public are interested more than the managers.

2527. Take the case of the Egyptian Hall; that has only one egress?—Yes, only one, and I think there are two or three halls at the end of that passage. There is Dr. Lynn's and Maskelyne and Cook's; they both have to use the same staircase.

2528. In case of a panic that would be a very dangerous place, would it not?—Yes, and it is a winding staircase too; it winds towards the top; it is an ordinary wooden staircase, such as you have in a private house, I fancy; it is not a very large place, of course.

2529. Mr. *Stewart Hardy.*] You said that your theatre was insured upon more favourable terms than any other; does that apply to the Criterion?—No; I do not think that any theatre in London is insured at less than 50*s.* per cent., except the Gaiety.

2530. We have had a good deal of evidence to the effect that the Criterion was the safest theatre in London because they could stop the draught and other things, but as far as you know it is insured at a higher rate than your own?—I think so.

2531. Sir *James M'Garel Hogg.*] Are you insured in one or more offices?—In all the offices; they divide the risk among them, the Sun, the Globe, the Azienda, and others.

2532. Sir *Henry Peek.*] Are you sure about the rate, because we have had it stated that it was considerably lower than that?—I have a delicacy in stating the rate, because the chief office asked me to withhold it, but the usual rate is about three guineas, and sometimes two-and-a-half guineas, but I believe 40 *s.* is the lowest rate that is taken.

Mr. *Robert Edwin Villiers*, called in; and Examined.

Mr. *R. E. Villiers.*

2533. *Chairman.*] You are, I believe, the Proprietor of the Canterbury Music Hall?—I am.

2534. As such, it is under the license of the magistrates?—It is licensed by the magistrates.

2535. In obtaining that license were any requirements made of you with regard to the construction of the building?—Yes.

2536. Previous to granting you a license for a music hall had they an inspection made of it on plans submitted to them?—Both plans were submitted to the surveyor, and when the plans were submitted to their surveyor they inspected

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them, that is under the new Licensing Act, but prior to the new Licensing Act when you could obtain provisional licenses, on their approval of the plans, and have them carried out, and then surveyed again by their surveyor before they confirmed their provisional grant; there was no inspection whatever of a music hall: you built it at your own risk and in your own fashion. With the exception of a survey by the district surveyor there was no control whatever by the magistrates, but since the new Licensing Act their surveyor inspects and they themselves inspect, and they are satisfied of the stability of the building before they confirm their provisional grant.

2537. That is on account of the application for a music hall being accompanied by an application for a spirit license, is it not?—No, not necessarily.

2538. Because the Licensing Act did not give the magistrates any power to inspect buildings which were only applying for a music hall license, did it?—No, but that is for music halls. Application for licenses for wines and spirits then were submitted to them.

2539. In consequence of a wine and spirit license being attached to a music hall, the Act of 1874 allowed the magistrate to inspect plans previously to granting a license, so that the expense to the proposed proprietor might not be incurred without sanction?—Yes, that was so.

2540. Was the Canterbury Hall built before that?—No, not the present hall.

2541. The present Canterbury Hall was built under that clause of the present Licensing Act, which enabled you to get your building approved of before the building commenced?—Yes.

2542. Under that license you were careful to see that the Canterbury Hall had all the proper modes of security and egress against fire?—Yes.

2543. Will you describe to the Committee shortly what those modes of egress are from the hall?—There are three from the stage or back part of the building, and there are two main exits from the front of the building in the Westminster Bridge-road; from the balcony there are two modes of exit; from the gallery there are two, and from the hall there are three; from the lounge adjoining another part of the back there is an exit; there are in all five exits from the back and five from the front.

2544. Are those all entrances which are distinct from particular portions of the audience?—They are perfectly distinct; that is to say, each side of the gallery, each side of the balcony, each side of the auditorium, and the hall portion has two exits; or, in other words, there is not any blind side to the building; no closed side.

2545. Those exits are available for the people in that particular portion, and do not serve for the other parts of the audience?—They do not serve for other parts.

2546. Therefore there is no danger of any block taking place from other parts of the audience getting into them?—Not the slightest.

2547. What number of people does the Canterbury Hall hold?—It would seat 3,000, and we have had as many as 4,800 pay for admission on one night.

2548. Have you ever yourself tested, from a feeling of curiosity, the time which it takes to empty the hall after the performance?—I have tested it, and it being a new undertaking, we have sometimes gone on, not being able to regulate our entertainment to a nicety, and it has been imperative that we should have the whole of the audience out before 12 o'clock on Saturday night, consequently I have been frequently compelled to get the audience out so that I should not infringe on the wine and spirit clause, and I find we can clear the building in about four minutes.

2549. I suppose you keep all those exits open which you have described during every performance?—We keep all those exits open. We lower the gas from the stage and lower it from the front, and play "God Save the Queen," and the people very soon vanish.

2550. They take the hint and go?—They take the hint and go.

2551. But practically, in the case of a panic, you would represent that from those different modes of egress the public are practically safe?—Perfectly secure.

2552. You

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2552. You have never been unfortunate enough, I think, to have any experience in the matter of panic there?—Not of panic.

2553. In the construction of the music hall did the magistrates' surveyor make any conditions a part of the certificate as to the fire-proof construction of the parts of the building?—No, he did not. He was a surveyor of some experience, and I think he perceived from the plans and from my knowledge of the requirements that everything was provided, as he scarcely offered a suggestion; he approved of them. The difficulty we experience is not that they will offer us any facility for a number of exits, but that the magistrates have a disposition to prevent us from having too many exits, under the apprehension that we should have too many communications for the sale of wines and spirits. I would wish to make a few remarks upon that later on if the Committee will allow me, because I think it is very important.

2554. Will you make them now?—The old music-hall licenses, under the 25th Geo. 2, attached to public-houses, of which there are many in existence now, merely go up for renewals; consequently they have not the advantage that applicants for a new license would have of being brought under the control of the surveyor to the magistrates, nor do the magistrates inspect them themselves, but renew as a matter of course.

2555. The magistrates renew the license upon the police certificate that the conduct has been good?—Yes, they renew the license upon the police certificate of good conduct. There is consequently no control whatever over the building or over the means of exit any more than the proprietor's self-interest to render the building as uninflammable as possible for the purposes of insurance. There is no protection to the public arising from thee supervision of the magistrates' surveyor, or the magistrates themselves.

2556. But in reality in all these old music halls there is no survey at all?—No.

2557. And there never has been?—There never has been.

2558. Would you suggest then that it would be advisable that in any change of the law some such authority as has been suggested which could survey, should do so?—Most unquestionably; whether with spirit licenses or whether without.

2559. You do not see any objection arising out of the difficulty of inspecting for construction the smaller ones attached to some of the public-houses?—None whatever; and I think the proprietors would feel a great desire to assist; but they are at all times limited by their fear of opening any entrance or any communication which would prejudice their license, or bring them unfavourably before the bench upon renewal days.

2560. But as long as they had a certificate from a properly qualified person showing that the construction of their places was properly arranged in the interest of the public, they would not object to such inspection?—I believe not.

2561. Would it be possible to bring the numerous old licenses which at present exist in any way under such new regulations as regards construction?—I think you might; I think if you did not constitute a public officer to survey buildings that the matter might be placed under the present surveyors, who inspect before they license the premises. There is a district surveyor now who acts as the magistrates' surveyor for each district.

2562. Distinct from what has been put before the Committee, and recommended that the district surveyors under the Metropolitan Board of Works should be the inspecting authority?—Yes.

2563. But you would suggest that the magistrates themselves have already a surveyor appointed who might carry out the new suggestion with regard to the old music halls, as he does now with regard to the newly-constructed ones?—Yes, there will be this advantage in that as far as the magistrates are concerned. It appears from the Middlesex bench, and from very many benches, that they entertain serious objections to facilitating either entrances or exits from places holding wine and spirit licenses, but if an exit or an entrance were recommended by their own surveyor it would remove that difficulty, or not bring the proprietor of that establishment unfavourably before them for making such an attempt upon the day of renewal.

2564. But you think it absolutely necessary in any change that it should be

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provided that all these places should be inspected with regard to their construction and safety to the public?—Yes.

2565. Should you see any objection to such regulations being laid down by those magistrates as are laid down by the Lord Chamberlain for theatres with regard to gas, and the seats, and the doors in music halls?—No, there would not be any objection whatever to similar regulations.

2566. To the regulations which are laid down to prevent doors being fastened but to make them swing both ways, so that there should be full egress?—Practically it is done by the music-hall proprietors without any supervision, for their own protection and that of the public.

2567. Therefore there would not be any objection to that being made a part of the magisterial conditions upon which the licenses were granted?—Certainly not.

2568. I suppose the music-halls generally are very large rooms; they are not in the form of theatres?—The old ones were more after the form of large rooms, put the more modern buildings are nearer in character to a theatre.

2569. In that case a part of the necessary construction I suppose you would think would be the separation of any part where the scenery or the acting was going on from the audience, by a brick wall?—Those music halls which are built like theatres have the provision of a brick wall to divide the auditorium from the stage carried up to the roof.

2570. And with regard to the storage of material, have they fire-proof places for that?—They must have an advantage over theatres in that point, inasmuch as they have no scene rooms, no property rooms, no carpenter's shop.

2571. So that they avoid the danger which there is in many theatres arising from these adjuncts to a theatre?—Quite so; I quite agree with the previous witness, Mr. Hollingshead, that a fire does not usually take place in the scenery, but usually from the carpenter's shop or property rooms and other offices about the theatre.

2572. I suppose the gas is a dangerous element?—Yes, but when the gas is burning there is always a gas man told off for any open light.

2573. As in a theatre you have always a sufficient staff told off for that purpose?—Yes.

2574. In point of fact the value of your property is quite enough to make you certain to take care of it?—Quite sufficient I can assure you.

2575. With regard to insurance, what are the premiums which you pay?—The insurance offices take the Canterbury Hall at half the rate of a theatre; I pay 30 *s.* per cent. for the stage and the theatre portion, and only 10 *s.* per cent. for the front building or entrance.

2576. Do you know whether that is in consequence of the Canterbury Hall being constructed, as you have said, upon a surveyor's certificate, or whether it applies generally to music halls?—No, it is because the building is exceptionally well built for protection from fire.

2577. But the risk in the old music halls is, of course, higher?—It is.

2578. Would it be possible, in your opinion, to reconstruct the old music halls upon the same principles as those upon which your new one is constructed?—No, they are like the theatres; some of them have no exit at the sides or back, so that it would be difficult to do so, but there might be additional exits afforded.

2579. You think, possibly, that it ought to be done where it was possible; that all additions in the way of exits, and separate passages, should be enforced in all cases where a large number of people were brought together?—I do think decidedly that there ought to be some supervision over them.

2580. In fact, the inspection you have stated as following upon the inspection by the magistrates?—Quite so. I think the real fact is, that the magistrates are prejudiced, and not the proprietors themselves. I think the proprietors would afford every facility, if they were allowed to do so.

2581. I do not know what you mean with regard to magistrates being prejudiced; the magistrates had never thought of anything up to a certain time but the convenience of the public; they had not thought of the safety so much until this new power was given them to survey the plans of a building prior to its erection, but they would not shirk the responsibility under the new Act?—I do not think they would shirk it; they would take a clearer view of the subject,

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ject, and would approach it with less prejudiced eyes; it would be beneficial, I think, to have the buildings surveyed by their surveyor.

2582. And regulations made similar to those of the Lord Chamberlain?—Yes, similar to the regulations of the Lord Chamberlain.

2583. Do you see any objection to those regulations being enforced by small penalties, if there were an infringement of them?—If the buildings were surveyed by their own surveyor, or any person who was an authority, who might be directed or appointed, it would be a sufficient penalty to hold the license in suspense until those regulations were complied with.

2584. That any infringement of a structural nature would be punished with a suspension of license?—Yes.

2585. But what I mean is: supposing regulations were made, such as keeping doors open, or that the gas on the stage should be covered with wire, and on inspection it was found that those regulations had not been complied with, do you think that such a penalty as that should be the only one available?—I do not think you could, either in theatres or music halls, regulate such trifling matters of detail by a penalty.

2586. I am supposing a case where the gangways are all stopped up with seats where they ought to be clear, or by turn-down benches, those being against the rules of the Lord Chamberlain, we will say, or against the rules of the magistrates, would it not be a simple way, supposing there was an infringement, to fine a man or suspend his license rather than to take away his license?—No; I think it would be a very dangerous precedent to inflict fines either upon theatrical managers or music-hall proprietors; they have, as a class, vested interests, and a penalty of that kind, I think, would open the door to many inconveniences; you would have frivolous reports constantly made.

2587. It has been pointed out to the Committee that the only penalty with regard to theatres which the Lord Chamberlain has the power to inflict is the taking away of a license, and that that is so far in excess as a punishment for any infringement of rule, or a fault which is committed, that it is practically never done. Then it is suggested that the suspension of the license might be adopted; the objection to that has been stated to be that the penalty falls upon other people than the guilty party, not only upon the manager, but also upon the company; I ask you whether, if you had a penalty of 5 *s.* or 10 *s.*, or whatever the penalty might be, for a breach of the regulations which could be inflicted, that would not be a more just way of dealing with a trivial fault of that kind than to go to the more serious punishment of suspending or taking away a license?—I do not think so. I think if managers persistently objected to conform to the requirements either of the Lord Chamberlain or of any other authority that it is not too great a punishment, because there should be a vast amount of protection afforded to the public, and he should not regard those requirements as needless. I think a penalty of 20 *s.* or 5 *l.* on the manager of a large theatre would be utterly insignificant; it would not be a sufficient penalty for an offence being repeated.

2588. You see no objection to a severe penalty being inflicted if the rules are not carried out?—I see none whatever.

2589. Is there any other point that you would wish to submit to the Committee?—The only other point would be that the galleries of public buildings are capable of great improvement in their construction, instead of the old staircase where people could fall over into the well; it is very much better to have them bricked up on two sides with a double staircase. I have a model of the staircase of the new Canterbury Hall which I should like to submit to the Committee so that they may be able to form some idea of what I am laying before them, but I am desirous that they should not think I am anxious to advertise it in any way.

2590. I understand this has been approved of by a surveyor, and you think it is one which might be adopted with advantage in such buildings?—Quite so.

2591. And in that way you think the disadvantage would be got over of people throwing themselves over, or being thrown over from the galleries?—Yes; the public in passing through such a staircase as that gain confidence. They know they will be protected, and that in the event of a panic it would have the effect of letting them off readily. Their previous knowledge gained in passing up the

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staircase would re-assure them, and there would not be a panic of that kind, They would have no fear that they would not get out, or would be hurled over, which causes the mischief, as a rule. Now with regard to a question which I heard spoken about by Mr. Abrahams as to chairs blocking up the gangways, an honourable Member asked if it would not be desirable to impose a penalty upon managers for permitting the gangways to be blocked up. I do not go to so great an extent as some people in the belief that it would be so very injurious. It certainly would contribute to break a rush, although there would be danger connected with them. If there is a penalty connected with the practice, I think it should be imposed upon the public, because the public take chairs from the bars and cloak rooms, and fee the servants to get them. In fact, you cannot account for where the chairs appear from. On a crowded night the stalls will be full of chairs of all sizes; people get them from all parts of the establishment. The manager is not responsible for it; the public themselves cause the mischief.

2592. You mean that there being a number of chairs in the saloons and other parts of your building, the audience themselves bring them in?—Yes, most unquestionably.

2593. You propose that the penalty should be reciprocal; that it should be recovered from the audience?—Yes; it would be excessively unfair that it should be only imposed upon the manager, because on very crowded nights a police officer might summon you, and have the power to get a penalty inflicted upon you, while you might be quite innocent of any offence.

2594. Do you think with regard to taking these chairs that your employés are not cognisant of it because the public pay them?—No, they would take them through when the man is engaged in passing people to their seats, and taking checks, they will get chairs from the cloak room; I do not say steal them, but borrow them unknown to any of the officials of the establishment, and place them in prominent positions in the stalls. To remove them would create a disturbance; perhaps it might be an ill-tempered quarrelsome person, and we are always anxious not to create a disturbance; and rather than create any disturbance they would allow the gentleman to remain in the chair, and when he rose from it it would be taken away. Perhaps the man might be persistent, and place it there again, and on a very crowded evening you would get as many as two or three dozen chairs in various parts of the building, blocking up the gangways. Naturally the gangways are the best places of sight, and the public obtain these chairs, and block up the gangways themselves.

2595. But the men who take those chairs from other parts of the building must pass some of your servants?—Yes, they would pass them, but on crowded nights when those chairs would be used it would be impossible for one's servants to watch the public taking chairs about; they are looking after the checks.

2596. Is it absolutely necessary that those chairs should be moveable chairs?—Yes; they would come from the cloak-rooms, boxes, and bars. If there is a penalty on music-hall managers and theatre managers for blocking up the gangways with chairs, it would be only a fair and just protection to the public themselves that any member of the public taking a chair should be liable to the same penalty, because by merely punishing the manager you do not remedy the evil.

2597. The only thing is that by throwing the responsibility upon the manager you make him very stern with his servants, who would as a matter of fact prevent it?—But we are dealing with it as a matter of accommodation for the public, and their own protection.

2598. I ask whether, in the protection of the public, you should know that dealing to take place?—You can scarcely prevent it, any more than you could make any positive rule for preventing a panic.

2599. Under those circumstances, a smaller penalty would be fairer than the punishment of taking away his license?—I do not think the placing of chairs is a matter upon which a license should be taken away.

2600. But supposing it to be one of the conditions imposed in the interests of the public, the infringement of that rule might render a man liable to lose his license?—Yes, if it were a persistent infringement.

2601. Then it would come back to this; that as that infringement of the regulation

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regulation would not be of so serious a character, in your opinion, should not the penalty be a less serious one than the taking away the license?—I do not think it would work so well. I do not think that small penalties for offences of that character are judicious; a person might harass the manager repeatedly and follow him about, and summon him for matters so trivial as that.

2602. Mr. *Ritchie.*] With regard to this question of chairs, you spoke about people taking chairs out of the cloak-room; have you not got an officer in your cloak-room?—Yes.

2603. Surely no chair could be taken out of the cloak-room without the knowledge of the officer there?—Yes, I think it could.

2604. Does not that show that there is a little laxity in the management of your establishment?—No; I deal not only with the Canterbury Hall, which is built like a theatre, but I deal with another establishment I have at Margate; the Assembly Rooms there. Of course I need not inform the Committee that it is not a usual thing to put seats in a ball-room; I have plenty of people for working an establishment of that kind there, but when we have a ball they will go into the hotel and take seats and bring them in. I have an establishment of 20 or 30 people to watch the chairs.

2605. Does not that all tend to show that when you have a crowd you have not a sufficient staff?—Yes; you have a sufficient staff if you render the public liable for moving the chairs, if you consider the chair question of sufficient importance; but I agree with Mr. Abrahams, I do not think it of sufficient importance.

2606. But would you, looking at it as a matter of importance?—If you look at it as a matter of importance, that alters the view of it; but I do not regard it as a matter of importance, and I do not think that any law or any penalty which you could impose upon the manager would be of any use. Take the theatres and the music halls, and some of the town halls, or the Egyptian Hall or Exeter Hall, I think the chair question would give rise to endless difficulty and trouble.

2607. Do you not think that the manager of the establishment is the person who should be responsible for the management?—Yes; he should be responsible for the general management. You should not allow him or his employés, in order to get a little profit, to place chairs in the gangways, but you should not render the man liable for any 25 or 30 members of the public who might choose to take chairs and place them in the way.

2608. Do you not think that one important regulation in a public hall is that there should be open passages?—Yes; those are just the passages the public will go to, because they are open and afford a good view.

2609. Do you not think that, if the passages are an important part of the place, the manager should be responsible for keeping them open?—No, I do not think so. I have had three or four establishments simultaneously, the Agricultural Hall, the Canterbury Hall, the South London Music Hall, and the Margate Assembly Rooms. The Agricultural Hall would hold thousands of people; the South London would hold 3,000 to 4,000, and the Margate Assembly Rooms 1,500; and I say that when there is a rush of the public it would be totally impossible for any manager to take the responsibility of keeping these gangways clear, because the public would be sure to shift their chairs into them if they had chairs, unless they were fixed. In the Town Hall at Shoreditch, for example, they will take the chairs and fill up the gangways.

2610. Then we may take it from you that at the time when it is most desirable and most necessary that the passages should be kept clear, that is to say when there is a crowded assembly, those passages practically are not kept clear?—Not at all times as regards chairs.

2611. Are you not aware in many halls the chairs are to a certain extent loose, that is to say, they are not fixed, but that there are a large number of them fastened together so that one of them cannot be moved by itself?—Quite so, but you will find in any place that you name, Exeter Hall or St. James's Hall, a considerable number of chairs which are not fixed.

2612. The question is, whether that is a state of things which ought to continue; now I will ask you this, you think that the person who moves the chairs ought also to be fined; how are to ascertain his name and address?—Only

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adopting the same principle as you do when a man is drunk or when he has got sober.

2613. Would you give him in charge?—If a person is drunk at a bar, or will not remove at the closing hour under the Licensing Act, you take his name. If you consider the chair question of such vast importance (I agree with Mr. Abrahams and do not attach such importance to it) upon the question of fire, and egress in the event of a panic, then I consider the public should be made responsible themselves if they remove chairs from any part of the building and place them in those passages,

2614. Mr. *Onslow.*] I understand since the passing of the Licensing Act none of the old music halls have been inspected?—I do not say they have not, but I do not believe there is any regulation which necessitates their being inspected.

2615. Then *quoad* fire, I presume they stand upon the same footing as they have always done?—As they have always done; as Exeter Hall stands on, and St James's Hall, and the Egyptian Hall, they are just the same.

2616. I presume you have a license to sell spirits?—I have.

2617. Mr. Pownall, one of the Middlesex magistrates, says that if there were a rule or some Act passed by which managers of theatres or music halls should be fined for the infraction of certain regulations, that would not have a deterrent effect, and he adduces the case of fines on people who keep public-houses; penalties ranging from 5 *l.* to 10 *l.*, and he says that the penalty is so small that it is not a deterrent. Now, as a gentleman holding a license, I wish to ask you whether it is not a fact that a fine, whether it was 5 *l.* or 10 *l.*, or even if it be 1 *l.*, would not be deterrent upon you?—Not the slightest. On a very busy night you would be so very anxious for the success of your entertainment, and for the general control of your establishment, that a fine of 1 *l.* or even up to 10 *l.* would not cause the slightest thought; a fine of 10 *l.* would not as a general rule influence a manager of an establishment on a large scale.

2618. Supposing you were fined 10 *l.* and your license endorsed?—Then you come to the point of the licensing question. Whether you would suspend the license or not; it must be either a very heavy penalty or it is not worth a penalty; you must place confidence in a manager, and if you find he does everything he can to fly in the face of the Lord Chamberlain or the magistrates, the best thing you can do is to take away his license from him.

2619. Are your men trained in putting out fires?—I have a man who has been with me some years; he is up all night and he is in bed all day, and another man comes on during the day, and that man keeps the plants watered, and keeps the garden in order; that would not of course apply to a theatre.

2620. Are those old fire brigade men?—No.

2621. What training have they had?—One of them has had as much training as would be required; he can do and undo a hose and work the hydrants, and work the hand pumps, and thoroughly understands using those long poles which are kept with a sickle at the end of them to cut down hanging scenery; it would be no use keeping a very weak man for such a purpose, it requires a man of some strength, otherwise he could not cut it away.

2622. He is not an actual fireman?—No, I do not agree with firemen in public buildings; I think the proprietor should have a man of his own, whose whole interest is with the establishment. Of course a fireman would have little sympathy with the establishment, and would not identify himself with it. As a rule, the men I have had told off for me from Captain Shaw have very frequently been in the habit of indulging; and sobriety is a very important thing on the part of a fireman. I should be very sorry if there was any law which compelled me to have a man from the brigade attached to my establishment as a fireman.

2623. Sir *Henry Peek.*] You speak with good knowledge of music halls?—Yes, and theatres.

2624. I think you said that before the magistrates licensed a music hall they had before them the plans?—We submit plans to their surveyor, and we then apply for a provisional license; and having applied, if they approve the plans, they grant it, and their surveyor then inspects the premises after they are erected, and they confirm their provisional grant by giving you a license; that is under the present legislation.

2625. We

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2625. We had Mr. Pownall before us, of the Middlesex Bench of Magistrates, and the honourable Chairman asked him, "In fact, in your view, the evidence which comes before the magistrates on those occasions is deficient to the extent that you have nothing to guide you with regard to the construction of places applying for a license;" and Mr. Pownall answers, "We have nothing but our personal inspection and the inspection of those magistrates who have been on the premises"?—I am afraid Mr. Pownall has overlooked the new Licensing Act in that answer, because as the Licensing Act enables you to apply for a provisional license, it is not reasonable to expect that a man would invest many thousands of pounds and erect a large building without first obtaining a provisional license; it was the case before the Act of 1874, but I think that Mr. Pownall, in giving you that answer, is in error.

2626. He is asked, "You are one of the bench of Middlesex magistrates, are you not?" to which he replies, "I am, and have been so for 30 years." Certainly if he be a magistrate now, with that experience, he ought to know; and his answer is diametrically opposed to the evidence you have given?—I cannot tell you what his answer may be; I can only tell the experience I have gone through; it certainly applies admirably to the building of any music-hall or large public-house.

2627. *Chairman.*] Because the proprietor of a music hall applies simply for the purpose of getting a license for the sale of spirits?—Yes.

2628. Consequently a license can only be granted to that house under that Act after the magistrates are satisfied of the construction of the house according to that clause?—Quite so; to that you had no supervision whatever.

2629. The clause was put in to get rid of the statement that people built houses under the Licensing Act, with no certainty that they would get a license, and this clause was put in that the license might be granted upon the plans before the money had been spent?—Quite so.

2630. Mr. *Stewart Hardy.*] You have told the Committee that you pay entirely different rates to the insurance companies for the stage portion of the Canterbury Hall and some other portion?—I said that for the stage and the auditorium I pay one rate, but for the front of the building in the Westminster Bridge-road I pay another rate.

2631. Is the front of the building entirely separate from the auditorium and the stage?—It is.

2632. With regard to the chair question, I suppose you would admit that the position of a West End theatre, or a building like the Canterbury Hall, is totally different from an audience bringing in chairs for themselves?—No, I would not, because I had considerable experience in West End theatres, because for some years before I had an interest in music halls I was an actor at the Haymarket, and I saw the same irregularity existing there that I do now.

2633. But you would not see any of the audience bringing in a chair without having paid for a seat in the stalls, and being given a chair?—He has paid for it.

2634. In the one case it is the manager's fault that it is so, and in the other it is the fault of the public?—No; you will find it in the large theatres and at the opera. I was at Mario's benefit, and I found that all the foreign gentlemen were getting all the chairs they could out of the refreshment-room and the cloak-room.

2635. But they would not be admitted into the stall part without having paid for a seat?—I do not speak of the stalls, but of the boxes; people at the back of the boxes placing chairs and obstructing the exit; I do not think the end of the town makes the slightest difference.

2636. Mr. *Locke.*] Where do the people sit; upon nothing but chairs?—Chairs and fixed seats.

2637. Where are the seats placed; is it all flat where the people go in?—At the Canterbury it is what we call a "raking" pit; it is elevated.

2638. Of course it is very inconvenient, if you have fixed seats, that those passages should be occupied by seats brought in in addition, but is it not very simple to say, You must not bring in anything in addition to sit upon?—It is very simple to say so, but they will not take any heed of you; they do it; you cannot lock them up; you cannot eject them. Suppose you had 10 or 20 people in the house on a crowded night, and you attempted to turn them out, the public would side with them, and you would have a commotion.

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2639. Where do they bring those seats from?—From various places about the building; the cloak-rooms and the bars, for example. In a large establishment you have a considerable number of chairs; the public would walk all over the place to get a chair.

2640. What distance has a person who takes hold of those chairs to bring them?—I could not tell you where they would bring them from. I have chairs of various patterns. I am rather particular about the chairs and fittings in my establishment, and the whole thing together, and to my astonishment I find chairs which belong to the gallery in the stalls, and I find them shifted all over the place. I am very particular about it, for it is a hobby with me; I have chairs for each balcony. I find them taken from the lounge into the stalls.

2641. Is there anybody to look after it?—We have a number of men in uniform but they find some opportunity to do it.

2642. Do they do that in every place?—I can only say that at Margate, where we have a ball-room and there is an hotel adjoining, the furniture there is crimson velvet, but they walk up the side stairs and get chairs from the bedrooms.

2643. How far would that be?—As far as from here to the lobby.

2644. That is a long way to bring a chair?—It is, but it is true.

2645. Somebody must see them coming along?—I do not think they do, because I watch myself, and your attention is so much occupied with giving pass-out checks and taking them in, that in a crowd you cannot see what is done, and you get some kind of curious people among a large congregation who do all sorts of things; if you allowed the public to come in here you would find them cutting the pictures down. I contend that if the chair question is of such vast importance, if you inflict any penalties on the managers for the entrances being closed or blocked with chairs, you should impose the same penalty on any member of the public who takes a chair and places it there.

2646. Would it not be a very good plan to lock up those chairs?—I do not see the advantage of that. If a lady or gentleman wanted to sit down, I do not see why you should have all the chairs removed from them because a few persons wish to sit down in the body of the hall on a crowded night.

2647. If it caused this great inconvenience, you might have fixed seats?—Then you would destroy the passages, which is just the point.

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Monday, 23rd April 1877.

MEMBERS PRESENT:

Mr. Clifton.
Mr. Forsyth.
Sir William Fraser.
Mr. Hardcastle.
Mr. John Stewart Hardy.
Mr. Hayter.
Mr. Herbert.
Sir James M'Garel-Hogg.
Mr. Kinnaird.
Lord Lindsay.
Mr. Locke.
Mr. M'Lagan.
Mr. Onslow.
Sir Henry Peek.
Mr. Ritchie.
Sir Henry Selwin Ibbetson.
Mr. Young.

SIR HENRY SELWIN IBBETSON, BART., IN THE CHAIR.

The Right Honourable the Marquis of *Hertford*, attending by permission of the House of Lords; Examined.

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2648. *Chairman.*] As the Lord Chamberlain you have the charge of the licensing of theatres within the area of the metropolis?—I have within the metropolitan boroughs, as defined in 1832.

2649. The power of your office is limited, practically, to the renewal of licenses on the annual licensing day?—It is; at Michaelmas.

2650. I believe your Lordship's office issues regulations, or rather, as Mr. Ponsonby Fane stated, suggestions to the managers of theatres for the protection of the public in case of fire?—We did that two years ago; there always had been regulations, but they were never put into print until quite lately.

2651. Does your Lordship represent that it was only two years ago that the regulations were first issued in the form of a printed paper?—Quite so.

2652. That printed paper deals with suggestions with reference to the protection of the gas by wire gauze, and as to the construction of parts of the theatre, and many other regulations, such as fire-hose and the supply of water, and the provision of hatchets?—Quite so; everything with regard to the safety of the public.

2653. I suppose that those regulations issue without any additional power being given to the office for enforcing them?—There were no additional powers, and the more I look into the matter the less power I evidently have, and I do feel that the responsibility is too great under the present circumstances for any Lord Chamberlain to bear.

2654. I suppose you would represent to the Committee that whilst the public look to you in a great measure for the protection against fire in these buildings, the only weapon in your hand, that of taking away the license, is too cumbersome to be used properly for enforcing small regulations of that kind?—The taking away of a license would be, in fact, too harsh a measure in 99 cases out of 100. Still I do feel so strongly that public safety is the first point I have to look to that I think the managers are all now pretty well aware that even if it was harsh, I should consider it my duty to refuse a license, or at all events to restrict it to short periods, say three months or six months, instead of a whole year.

2655. That is to say, practically, you would suspend a license for part of a year as a punishment for infringement?—Quite so; that would be exactly the case, in order to have them more under control for the future.

2656. I suppose the principal objection to using the suspension, or the suppression of a license, is that the punishment falls practically on many innocent

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persons; that is to say, on the staff of the theatre, who are punished without any fault of theirs for the fault of the managers?—Quite so.

2657. Your Lordship would therefore endorse what was suggested by Mr. Ponsonby Fane, that the regulations made by the Lord Chamberlain should be enforced as police regulations by money penalties rather than by the more stringent method of suppressing the license?—I do, because I do not feel that the Lord Chamberlain ought to be a public prosecutor, and that the penalties ought to be recovered by some less cumbersome mode than an action at law, and that that would be done more quickly at the police office.

2658. You would make them police penalties, in fact?—I would.

2659. Does your Lordship agree with the evidence which the Committee have had from the office from Mr. Ponsonby Fane, that with regard to the construction of theatres there should be a separate branch, or a Government department established for that purpose?—I think I may say generally that I agree with all that Mr. Ponsonby Fane has given in evidence. I know that he has had such immense experience in this matter for the last 20 years, and that he does manage them so judiciously, and with such tact and *savoir faire*, that it would be a bold man who went against his opinion. Nevertheless, I feel that the regulations having been printed the public now naturally look to the Lord Chamberlain for protection; Mr. Ponsonby Fane rather differs from that view. He wishes to leave the responsibility with the managers, and so do I, but I see that the public, now that the office have so long issued their regulations and suggestions, is looking to the Lord Chamberlain as the responsible officer.

2660. That being so, you would represent that whatever power, in the first instance of sanctioning the construction, and then of licensing the house, was given to the Lord Chamberlain, it should be made an effective power?—I have a very strong feeling that there ought to be a separate department, provided that department belonged to the Government, but not otherwise.

2661. You think that the department which should certify, as has been suggested, the construction of all new theatres, and should examine the construction of all old theatres, should be one which as a matter of course ought to be a Government department?—I do.

2662. And that the matter should not be, as has been suggested to this Committee, dealt with by the Metropolitan Board of Works through their district surveyors, and subsequently dealt with by the Lord Chamberlain, merely as far as the licensing is concerned?—I think there are two strong reasons against the authority being the Metropolitan Board of Works. One is that they are too numerous a body, too many masters to deal with; and the other is that I do not think it would be proper that the decisions of the Lord Chamberlain, who acts as an officer of the Government, responsible to Parliament, should be subject, as it were, to a Board, which is not a Government office, and not responsible to Parliament.

2663. Supposing a new department to be established, and that department to be made efficient, as far as its working powers are concerned, would you limit it as now to the theatres and places of amusement in the metropolis, or would you make it a department governing the whole of those buildings throughout the country?—I would rather that the Lord Chamberlain gave licenses for the building of new theatres, after receiving a certificate from the new department, but after giving a license I would leave it to the different corporations of the towns, and the borough magistrates. Take Birmingham for instance as being a large city. I do not think that any department here, however well managed, could undertake the management of theatres in similar large towns without doing it through the members of the corporation.

2664. I understand your Lordship to say, that whilst you think, as far as the construction was concerned, the central authority should always satisfy itself that the public safety had been studied in the theatres everywhere throughout the country, you would leave the regulation of those theatres when so certified to the local authorities, whilst retaining the licensing power and the regulations to the Lord Chamberlain's office in the London district?—That is exactly my opinion.

2665. Mr. Phipps, an architect, who was examined before the Committee on a former day, stated that one of the orders recently issued from the Lord Chamberlain's office had been with regard to the support of a staircase by iron girders;

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girders; a great deal of evidence has been given to the Committee that that mode of construction is not the best as a protection against fire which could be suggested. Would your Lordship wish to state to the Committee the reasons which influenced the Lord Chamberlain's office in that order?—On looking back to the correspondence in question, I find that the stairs had been used only for the purpose of intercommunication between the different tiers of boxes. After the Brooklyn fire we saw the necessity of increasing the means of escape for the audience, and in order to use those stairs for the purpose it was necessary to support them. I then gave an order that the supports should be made of iron, for this reason, that the Metropolitan Building Act prescribes fire-proof material. I myself think wooden girders are better, but it was not for me to take upon myself to order them when the Metropolitan Building Act had prescribed iron ones; it is a matter of opinion which are the safer.

2666. You think, as has been stated by Mr. Hollingshead, that the relative safety of wood and iron in the construction of theatres is a question which ought to be cleared up?—I think it ought. Certainly Captain Shaw gave his opinion against iron girders, but a great number of other people think that they are the safer. I should have said that those stairs so supported, at all events, would give support for a time necessary for the audience to escape by them, and that was my object.

2667. That though they might not resist the action of fire after a time, yet whilst complying with the Metropolitan Building Act, they were supposed to be sufficient for the purposes of escape?—Quite so.

2668. I believe after the Brooklyn fire your Lordship had an inspection made of a good many theatres, not at the time of your annual inspection, but during the pantomime season this year?—I have always been of opinion that if our staff was large enough we ought to have a very constant inspection, not only an annual one, but a very constant inspection at night while the performances were going on; still there have been always difficulties about that; it interferes not only with the performance, but with the public comfort; but on this occasion, when everybody was thinking and talking about the Brooklyn fire, which had happened recently, I thought it my duty to send round to the theatres in London to see if my own regulations had been carried out.

2669. And that you would represent ought to be a necessary part of the enforcement of any regulations which were made by an efficient office?—I do.

2670. A report was made to your Lordship, I believe, in consequence of that inspection, and were there instances brought to your knowledge where the regulations laid down, which were shown to be properly carried out at the time of the annual inspection had been done away with, or otherwise evaded?—There were in some cases, but not of any serious character. I must say that the managers as a body take great pains to attend to the suggestions and regulations which come from our office. I attribute that in a great measure to the tact that I was mentioning on the part of Mr. Ponsonby Fane; if he were gone, I am not prepared to say how the office could be worked, but up to the present time there is no doubt the managers are very anxious, with some few exceptions, and they are very few, to fall in with our ideas and wishes.

2671. The reason of that question rather arose from the fact of its having been stated to the Committee, I think by Mr. Robinson, that he had found one of the swing doors permanently fastened on the occasion of the inspection, which had been previously found properly constructed and in proper order at the time of the renewal; that would illustrate the necessity of more frequent inspections at times when the managers were not prepared for the visit, would it not?—It was the case that a door was fastened back, but I sent at once to know why it was so, and the manager gave a very good explanation of it. The passage had been diminished in width, and where the half of the door had before been fastened back, the second passage came out, and therefore it was hardly possible to make both doors open: if both of them had still been open, one of them would have blocked up this new passage.

2672. That in consequence of a new construction of passages the door really did not carry out its original intention?—Quite so.

2673. The one-half of the door practically or very nearly represented the width of the new passage?—Very nearly so. I should say that all the recom-

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mendations of the Report have been either carried out, or will be so, before the next licensing day. At all events, I was very glad I had sent round on that occasion.

2674. Your Lordship has always found what the managers state to be their interest, namely, that they do their best to carry out the recommendations, in consequence of the feeling that the greater protection they give to the public against fire the more they protect their own property?—That is so.

2675. The Committee had some evidence the other day from Mr. Pownall, one of the bench of Middlesex magistrates, in which he stated to the Committee that licenses in some instances were granted to buildings by the Lord Chamberlain's Office which had been refused by the justices. Will your Lordship state the reasons why that divergence of authority had taken place?—I saw Mr. Pownall's evidence upon that point, and I have looked back to see the precise instances. I found that there were three, namely, the Alhambra, the Gaiety, and the Varieties, at Hoxton. The circumstances under which those licenses were refused were entirely different from those which guided the Lord Chamberlain in granting the licenses; it was before my time, but the decision of the justices was well considered in each case, as I am informed.

2676. That was in Lord Sydney's time, was it not?—I think some were in Lord Sydney's time. In all of them, the construction of the buildings, and the character of the entertainment to be given, were duly considered before the issue of the Lord Chamberlain's license. I could go even more into detail, if the Committee wished, upon these matters.

2677. I suppose, in all probability, the magistrates' refusal was grounded more on the objections of neighbours, or people who thought that another theatre was not wanted, where your Lordship's inspection went more to the question of construction?—Perhaps so.

2678. And the safety of the public, admitting the right to start a theatre?—And I may also say on moral grounds. With respect to the Alhambra, between 1860 and 1870 the Lord Chamberlain had, on more than one occasion, refused to grant a license to the Alhambra, on account of the insecurity of the building. The justices for Middlesex all this time continued their license to it for music and dancing. In October 1870 the justices declined to renew the license, on account of an indecent dance having been performed there. In the following year the manager, Mr. Strange, applied for the Lord Chamberlain's license for stage plays, undertaking to make extensive alterations in the building, to render it secure for the public, and to conform in all respects with the regulations of the Lord Chamberlain as regards order and decency. The plans were submitted and duly reported on by the inspector, and they were carried out; and the Lord Chamberlain, with the view to improve the character of the performances, issued his license for building on a principle which had been very often found successful with regard to some of the old saloons, on being converted into theatres.

2679. That merely represents that, although the justices had refused on the ground of morals, the office of the Lord Chamberlain took every guarantee that they should be protected, whilst they took the further guarantee that the construction of the building should be such as to protect the public from danger?—That is so.

2680. Therefore the inference that was drawn was not correct, that the question of the morality of the performance never entered into the mind of the office?—On the contrary, it was very much done with a view to keep them in better order than they could be kept in merely by the police under the justices. Then with regard to the Gaiety Theatre, that was formerly the Strand Music Hall; the license which they had held for some years from the justices was refused by them in 1866 on account of a breach of the conditions of their license, and also on account of there being no responsible proprietor, the building at the time being for sale. In 1868 Mr. Hollingshead, having become lessee of the property, submitted plans for converting it into a theatre, which, after due consideration, were approved and carried out, and the theatre was licensed by the Lord Chamberlain.

2681. After those alterations had been made?—Yes, after those alterations had been made. And with regard to the Varieties, at Hoxton, that was refused a license by the justices for music and dancing in 1869, on the ground that the building

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building was not completed. In 1870 the proprietor applied for a theatre license to the Lord Chamberlain; Mr. Pownall was consulted, and reported that the proprietor was respectable and the house well conducted; the plans were inspected and found in accordance with the requirements of the Lord Chamberlain, and the place was licensed as a theatre.

2682. There was another statement made by Mr. Hollingshead about the Globe Theatre and the license being suspended?—Yes.

2683. That was an instance of a license being suspended?—Yes.

2684. That license, it was stated, was suspended in consequence of something which had been done to annoy the then Lord Chamberlain; does that give an accurate account of what took place?—Most certainly it does not. It was in 1874, the first year I was appointed. In consequence of an indecent dance having been performed in a piece entitled "Vert-Vert" at St. James's Theatre, the application by the manager for a license for the Globe, to which he had removed, for the following year was refused by the Lord Chamberlain; but pending an action which had been brought by the manager against the "Vanity Fair" newspaper for an alleged libel on account of the said dance, the Lord Chamberlain consented to grant the manager a temporary license, in order that his case might not be prejudiced by a refusal. In December 1874, the action having been decided against the manager, the Lord Chamberlain (I was then Lord Chamberlain) declined to accede to his request for a license for the Globe Theatre, on the grounds of indecent dancing and a breach of decorum which had been substantiated in court; subsequently, however, in 1876, after many promises of good behaviour from the manager, I consented to give him a series of short licenses, and those short licenses are continued to the present time.

2685. Mr. *Forsyth.*] He was not found guilty; he failed in the action that he brought?—Quite so. I thought that was a very good case for making an example of a manager; therefore it was not in consequence of my having been caricatured; in fact I was not caricatured; but there were some bills about the town and in Birmingham.

2686. *Chairman.*] I suppose that, on inspection, your Lordship's office satisfied itself as to the character of the dance before any action was taken?—I went myself to see the dance; there had been very great doubt about it. I was subpœnaed, and I gave evidence to the effect that it was most undoubtedly an indecent dance; I would not have it. From that moment all dances of that kind, what they called Can-can dances, have been strictly prohibited, and I must do managers the justice to say I believe that regulation has been carried out.

2687. That was an instance, as I understand your Lordship, in which, even up to the present time, the license is not an annual license, but is granted for short periods, which you would suggest as a means of keeping greater control over the managers, supposing you had once found them to infringe their license?—That is so; in point of fact, that is almost the only penalty we can now inflict.

2688. In the proposed change which your Lordship has suggested, I infer that you would wish that all those theatres which are at present outside the Lord Chamberlain's jurisdiction should be brought under his authority for licenses?—Most certainly I should, because it is very disagreeable to have that present anomaly of things being allowed at one theatre which are not allowed at another.

2689. Are Chelsea, Kensington, and other modern boroughs practically under your authority?—They are not under my authority.

2690. They are under the magistrates, are they not?—They are under the magistrates, because they are not in the metropolitan boroughs, as recognised by the Act that was passed in 1832.

2691. That being the case, your Lordship would recommend a responsible Government department to deal with the whole question of construction throughout the country, and that the licensing and regulations should be left to the Lord Chamberlain's office with regard to the metropolitan area, and to the local authorities in the country; how would you recommend that the music-halls, at present dealt with by the magistrates, should be treated; should they be under

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the same authority as to construction?—The subject of music halls is a most difficult subject, because there are such a large number of them in London. It was calculated, I believe, that in 1866 there were no less than 600, and I believe since that period they have gone on increasing, and although I have thought of the matter very often, I do not see how the music halls in any way could be put under the license of the Lord Chamberlain; it would be very difficult indeed, without having a very large staff, and making him, as it were, a minister of public amusement, as they have in France. In using the term music halls, I include all places licensed for public entertainments within the metropolitan police district.

2692. Do you see the same objection to the Board of Construction, or the department which had to do with construction, having to do with music halls as well as with theatres; that is that they should be all under the same authority, as far as their construction was concerned?—I should recommend that.

2693. But you would recommend that as far as the licensing and regulation of theatres go, whilst that were placed entirely under the Lord Chamberlain, the regulation of music halls should be placed under the management of the local magistrates as it is now?—Not only do I think the theatres should be placed under the same authority with reference to their construction, but I would carry it further with regard to all places where the public congregate in numbers, including both churches and chapels. There are several which, from having only one exit, are exceedingly dangerous in case of panic. Of course I am aware that fires are not so likely to occur in churches or chapels, but still other reasons sometimes exist for creating panics, and there are several places which are very dangerous. Now Exeter Hall, for example, is said to be one of the most dangerous places in London, and I would certainly put any building of that sort under the department of which you have been speaking.

2694. Does your Lordship see any difficulty when that was done, and all buildings placed under this department for the purpose of being so inspected, as far as construction was concerned, in dealing with the old buildings. Of course there is no difficulty in laying down rules of construction with regard to newly created buildings, but with regard to the old ones, from their site and the nature of their foundations, there would be a difficulty in carrying out what you would consider a perfect plan in their case?—Undoubtedly there would be very great difficulty indeed; there are some small rooms which were not built for that purpose, which will only hold 100 or 200 people, and which are entirely inadequate to support any great weight of people, and if a panic arose accidents would, no doubt, occur in them.

2695. At the same time the danger is so great in those cases, that we may gather that your Lordship thinks inspection is necessary for all those old buildings, as well as for any new ones which are proposed to be created?—Quite so; some of the old theatres are not what you would wish them to be. With regard to new theatres that is a different thing; practically I think the old theatres are made as good as one would expect them to be made, but they are not so good as one would wish them.

2696. Is your Lordship speaking of those theatres built in the last few years?—No; those theatres built recently have in nearly all of them the best arrangements that can be made.

2697. Mr. Ponsonby Fane told the Committee that with regard to the Criterion, which was one of the most recently erected theatres, the construction had been very carefully studied in that case, and that the suggestions of your Lordship's office had been carried out?—I believe the Criterion Theatre to be one of the safest playhouses in London; all the most modern inventions have been attended to there, and I believe it is as thoroughly safe as any in London.

2698. That theatre is protected both as to the number of its exits and the security of its passages, so as to give the public in it almost as great security as you can ensure in case of panic?—It is so, even to having an invention to carry away the smoke in case of there being a fire; that is done by the gas sunlight abstracting the smoke, which I am told would be successful; whether it is so or not remains to be proved.

2699. But what Mr. Henderson described as the power of ventilation has been

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been carried out to a condition of perfection?—Quite so. To return to music halls, you asked me as to their remaining *quoad* morals under the justices. I am bound to say that I think nothing can be worse than the whole state of the music halls at present; it is a subject which requires looking into most thoroughly.

2700. Does your Lordship suggest that the licensing of plays or pieces which are to be acted, or songs to be sung in music halls, should be placed under the Lord Chamberlain's authority?—It is hardly possible that they could be; they are too numerous; it would be impossible to bring up every song for license.

2701. What would your Lordship suggest the magistrates should do with regard to that; should the magistrates themselves have an inspection with regard to the pieces which were acted?—It is a most difficult point to give an opinion upon. I should rather like to refer to the evidence given in 1866 by Lord Sydney, who knew much more of these subjects than I do, having been a very great number of years Lord Chamberlain, and having had a particular aptitude for subjects of that sort. I quite agree with all that Lord Sydney said, but of course there is very great difficulty. As you are aware it was recommended by that Committee that music halls should be put under the Lord Chamberlain, but it was found so difficult that the whole thing broke down, and never came to anything.

2702. The inquiry of this Committee is limited to a great extent to the protection of the public as far as fire is concerned, and what your Lordship as I understand is suggesting to the Committee is, that when alterations are made, as far as the construction of those music halls goes, it might be well to consider whether some further protection could not be secured?—Quite so.

2703. Mr. Hollingshead stated that one of the objections which he had to this division of authority (that is, that a Government department be established, or that the Metropolitan Board of Works should have authority over the construction of theatres, and that the licensing should be left to the Lord Chamberlain) was, that neither the Metropolitan Board of Works nor the Lord Chamberlain were responsible officers; that is to say, responsible to Parliament?—I beg his pardon; the Lord Chamberlain is responsible for his actions to Parliament exactly in the same way as any other of Her Majesty's Ministers.

2704. I thought it right to put that to your Lordship, but of course the Lord Chamberlain is responsible for carrying out his duties to Parliament?—Exactly, in the same way as the head of any other department.

2705. The difficulty which would have to be met in enlarging the Lord Chamberlain's department, if new branches of duty were given to him, would be the financial difficulty; at present the Lord Chamberlain's office is part of the Crown expenditure?—It is all paid out of the Civil List, and is therefore, in point of fact, out of Her Majesty's pocket.

2706. Of course, if a department to inspect the construction of theatres and music halls were attached to the Lord Chamberlain's office, the department must be paid out of the public funds?—It must, or by fees upon the inspection of theatres; it might be supplemented by them at all events.

2707. Has it ever been considered by the office whether, by a system of fees, a larger staff might be kept for the purposes of this inspection?—Yes, I think it has; and it has been, I believe, generally considered that a good deal might be done in that way, but still not the whole. It could not be sufficient for so large a staff as would be necessary, if all those duties were carried out upon the scale you have suggested.

2708. Of course provision must be made for any deficiency to be met in that way, instead of throwing it as an additional charge upon the Queen's purse?—Quite so.

2709. Is there any point which you would like to place before the Committee in your evidence in chief?—I am not quite sure whether all the circulars and regulations which have been issued in the last three years have been put in; I think not. There were some which were not, and I think it is right the Committee should have them before them.

2710. Do you therefore hand in any additional regulations which have been

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made subsequently to those which have been put in?—These regulations have been made in my time, within the last three years.

2711. Are those regulations enforced?—They are enforced, and strictly enforced.

2712. Does your Lordship represent that they vary from the last which has been handed in by Mr. Ponsonby Fane?—No; I think you have a list of the regulations, but there have been circulars calling attention to those regulations, which have not been handed in. (*The same were handed in*).

2713. You would represent to the Committee that those were circulars which were issued with a view of calling the attention of managers to the regulations and supplementing them in certain points?—In order to show that even before the Brooklyn Theatre catastrophe, our attention had been constantly directed to these very securities for the protection of the public.

2714. It has been stated to this Committee, although the Brooklyn Theatre fire is an instance, and a horrible instance of course to the contrary, that fires during the performance at theatres in England have been of very rare occurence, in fact almost unknown?—I think, according to Captain Shaw's report, there have been only three fires within the last 20 years, and in the last 10 years none at all, and as I may say that is entirely in consequence of the personal superintendence of Mr. Ponsonby Fane. In one instance alone was life lost, and that was at the Victoria Theatre in 1858, and that not by fire, but by an unfounded alarm made at the gallery entrance.

2715. That really the regulations which are now enforced, and which the managers very fairly carry out, have been of immense advantage to the managers, they feeling a dread of such a disaster, in preserving the public from any catastrophe which might occur?—That has been so every year during the last 20 years. In spite of that, I feel that the responsibility is greater than anybody ought to be called upon to bear, looking at the very small power which the Act of Parliament gives.

2716. That as, every day, the public are apt to look more to the Lord Chamberlain, and depend upon him for security, your Lordship is of opinion that the power which he has should be made a reality, instead of being as it is, almost nil?—That is so.

2717. You have handed in some circulars; are there in the office any answers which have been given to those circulars?—There have been a great number of answers, but I would not say those answers have been kept; a certain number of them have been at all events.

2718. What your Lordship would represent is, that those additional circulars which have been issued show that the department has been constantly alive to the fact of securing the proper performance of the plays represented, and the security of the public?—That is so.

2719. There is only one more question which I wish to ask you in your evidence in chief, and that is with regard to the two theatres which are supposed to be patent theatres, Drury Lane and Covent Garden; I understand that they do not recognise the authority of the Lord Chamberlain, so far as the license is concerned?—They are open under patents, and consequently have not to come annually for license, but we have always found that the managers have been very happy to attend to all suggestions made to them, quite as much as the managers of other theatres.

2720. I suppose that, in any alteration of the law, it would be necessary that all such ancient rights as those should be done away with, and that they should be brought, as far as their theatres are concerned, under the same management as other theatres, for the protection of the public?—I should certainly recommend that they should be.

2721. Mr. *Forsyth*.] It has been represented to this Committee that it would be desirable to have a staff of inspectors distinct, as I understand, from the office of Lord Chamberlain, whose special duty it should be to inspect theatres; how many inspectors have you at your command?—At present the Comptroller and the Examiner of Plays are the only two, but I call in a regular architect who goes round with them; for the last few years it has been Mr. Robinson, who has been before you, but there are only those three.

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2722. As I understand it has not been the custom of these inspectors to go at different times when they are not expected, but only once a year, and almost always after notice given?—That is so, but then if anything goes wrong, if you or anyone wrote to me to remark upon anything you had observed wrong, I should send immediately to ascertain the condition of that theatre, and particularly on the point complained of.

2723. I suppose the objection against the inspectors going suddenly, without any notice, is that it would be difficult to get access to the different parts of the theatre; that the doors might be locked?—Not so much that as that it would interfere with the business going on, and more particularly with the comfort of the audience.

2724. I am not talking of inspection at night. As I understand until lately the inspectors have never gone at night, and the reason given for it was that it would be almost impossible to conduct this inspection without interfering with the comfort of the audience, but even in the daytime when the audience is not there, it would not be easy unless notice were given, to get access to the different parts of the theatre which it is necessary to examine in order to see into the means of safety against fire?—There would be no objection made on the part of the managers if we wished to look over a theatre at any time; that has been done repeatedly.

2725. Would your Lordship suggest any increase in the number of inspectors beyond your present staff which you have at present?—I think it is perfectly impossible to do more than is done at present with our staff, and it ought to be greatly increased if we are to go from time to time to inspect theatres.

2726. With regard to music halls, as I understand from your Lordship, it would be impossible to have them all placed under the supervision of the Lord Chamberlain so as to have a license for the different songs, and so on; but you suggest that the construction of all music halls with regard to safety from fire should be under one board or department, the same as regulates the safety and construction of theatres?—There should be an officer who should give a certificate to the Lord Chamberlain or to the justices, or whoever were going to license the music hall, before that license was given, and only on that certificate should the license be granted whoever it might be from, whether it was the Lord Chamberlain or otherwise.

2727. Supposing that was so, after the parties had got their license, as regards the construction of the building, from that department, you would exercise your own discretion with regard to the granting of the license, and as to the nature of the pieces which were to be acted?—Quite so. I should hope that whoever gave those licenses, they would be required to go from time to time to see that their regulations were kept up.

2728. Mr. *Kinnaird*.] Has it ever occurred to you that if the inspection should be removed from the Lord Chamberlain, under what other Department of State it could be put more advantageously?—I should say the Home Office is the only one that it could possibly be under.

2729. Do you know at all what the late Lord Chamberlain's views were upon that point?—I think if you will look to the evidence given before the Committee which sat in 1866, you will find that he was strongly in favour of keeping the matter under the Lord Chamberlain's jurisdiction, but increasing the staff materially, of course, with the Queen's sanction.

2730. You feel that if the staff were increased largely the money for that purpose should not be taken from the Queen's privy purse but from the State?—Quite so; that not one farthing more ought to be taken from the Civil List for theatrical purposes than is now done.

2731. Mr. *Young*.] I understand your Lordship to be of opinion that, subject to your office having greater power, it would be well that the other theatres should be put under your jurisdiction?—Yes, the Court and those other theatres in London which are not now under my jurisdiction, in order to avoid the present anomalies.

2732. And you do not see your way to take charge of the music halls, because of their great number?—Because of the enormous number of them.

2733. When Lord Sydney gave evidence in 1866 there were not so many of them?

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them?—There were at that time about 600 places licensed for entertainments.

2734. There is this difference, is there not, between your licenses and the licenses which are granted by the magistrates, that in the one instance the public have some opportunity of being heard, and are heard as to the necessity or expediency of granting them, whereas you I suppose have, at any rate, no public tribunal to hear such complaints?—I believe there is no appeal, except that in my place in Parliament I am bound to answer any question which is asked me.

2735. I do not mean that, but that when a theatre which is not under your jurisdiction has to apply for a license, the public can appear by counsel before the magistrates?—I believe they can.

2736. Whereas your license is given upon your own authority after due inspection and consideration, without the public being in any way consulted; is not that the difference?—That is so.

2737. As respects an increase in the number of inspectors, supposing Parliament thought well to throw upon your office any very large increase of additional duty, would not the district surveyor of each district or parish be in most instances the proper officer; of course they must be put for this purpose under your office?—I should be sorry to see it done, for they have a great many other duties already.

2738. You are not in favour of that?—Certainly not.

2739. Mr. *Clifton.*] I think you give a yearly certificate to most of the theatres?—Yes, a license.

2740. In the case of any infringement of the rules and so on, have you any power to rescind the certificate?—We cannot rescind it. I have always considered that the Act did give me that power, but I am now advised that it does not give me the power of rescinding the license, except in case of riot or misbehaviour in a theatre.

2741. I suppose you think you ought to have the power to suspend the certificate?—I think I ought.

2742. And in case of your not granting a certificate to a manager who feels himself aggrieved, has he any appeal against your decision; can he bring any action against you?—I do not think he could; it has never been tried, and I have never seen any inclination to do so.

2743. Sir *Henry Peek.*] I understand your Lordship to say that you can grant short licenses?—Yes, in this very case which I have mentioned of the Globe; we have been giving short licenses there in order to keep a greater hold over the manager.

2744. But that a license once granted in September or October stands good for the year?—Yes, unless granted for shorter periods.

2745. Would it not be a great improvement if the Lord Chamberlain's Department had the power to suspend a license, say for a week or a fortnight, for any breach of the rules?—I think anything would be an improvement upon the present state of things, but I would much rather do it by means of police penalties, as I stated just now, because then the managers only would suffer, but in the case of the license of a theatre being suspended for a week or a fortnight, all the actors, actresses, and supers would be thrown out of work.

2746. One of the witnesses told the Committee that companies are not so easily got together, and that therefore if your Lordship were to suspend a license for a week or a fortnight, the manager dare not get rid of his company lest he should not be able to get them together again?—I think that might be the case, and therefore it would be a very severe penalty to the manager.

2747. Do you consider that printed paper in the light of a recommendation, as our honourable Chairman has said, or of a regulation?—They have always been called suggestions and recommendations, but I must say that I look upon them as regulations which ought to be enforced, and I never could understand the difference between them. If I give out regulations, I think they ought to be enforced, and I always will do my best to enforce them.

2748. Your Lordship will agree with me that a recommendation would be optional, whereas a regulation ought to be positive?—That distinction has been drawn very much in the office for some years; I think chiefly from the officers of

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of the department knowing perfectly well that our powers are very small, but since I came to the office I have, by a little more firmness, tried to make the managers consider them as orders, and not suggestions.

2749. Might I ask you if the theatre at Windsor is under the Lord Chamberlain?—It is, because it is within the precincts of a Royal palace.

2750. How often would that theatre be inspected by your officials?—Once a year, the same as other theatres.

2751. Would it surprise you to hear that the Member for Windsor, who is the proprietor of that theatre, told me the other day that for a long period of time the main exit of that theatre was choked up, and used practically as a warehouse for all sorts of scenery and articles not required, and that he himself, of his own notion as the proprietor, ordered it to be cleared out, and the doorway put to its proper use as an exit?—I am aware that that theatre was very dangerous many years ago, but I have heard no complaint of it lately, and my attention has not been particularly called to it, therefore I can hardly answer the question with reference to whether it was only by the order of the Member that it was closed.

2752. The Committee have had before them two or three witnesses who have spoken with reference to the expense of inspection. Mr. Robinson was asked: "You would suggest that the theatres should be inspected monthly"; and the answer to that is, "I would not make it a stated time; I would go at any time throughout the 12 months. *Q.* Would the expense of that be any objection to it in the Lord Chamberlain's office? *A.* Yes, a great objection." You really would not feel yourself justified in putting the department to much more expense than you do at present?—I could not do it; the funds would not allow it.

2753. Mr. *Onslow.*] I understand you to say that since the Brooklyn fire you have inspected many theatres by night?—Very many of them. Not I, personally, but those whom I have sent.

2754. Did you send notice when your officials were going?—No, I think an officer went without sending any notice at all; it may have got wind that the officers were coming round, but in most instances they went without being expected.

2755. And I understand you to say that you intend to persist in making night inspections?—If I can; but I really have so small a staff, and of course it costs money to do it; therefore I can only do it to a very small degree, but I certainly shall, from time to time, whenever I think it necessary.

2756. For the protection of the public from fire, I understand you do think that a night inspection is far better than one by day, is that so?—No, I would not say that, because there are so many points which cannot be looked into at night while the performance is going on. You could not look to the hose, the buckets, and many other things. I think inspections are necessary, both in the morning and occasionally in the evening, but certainly more than once a year, as has hitherto been the case.

2757. Have you power in your office to insist upon doing away with what they call naked lights?—There have been several orders given about that.

2758. Are you aware that at the present time, in a great number of theatres, they constantly use naked lights?—I was asking about the matter recently, and am assured that there are no unprotected foot lights used.

2759. The inspector who has been round at night to inspect those theatres has not brought to your notice that naked lights are constantly used?—I am not aware of it; if we were we should certainly send to the managers immediately, and beg them to protect them.

2760. The Committee have had a great deal of evidence brought before them, that it was a very constant practice to have naked lights without any protection whatever?—It is possible, but certainly it is against the regulations.

2761. Supposing you found that this were the case, and you were to write to the manager to say that such a thing could not be allowed; we have had it in evidence that it is almost impossible to protect those lights by any kind of gauze; then how could you insist upon the safety of a theatre from fire in that particular respect?—All I could do would be to tell a manager that it should be

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be done, and if he does not do it the responsibility would fall upon him, and it would rest upon his head if any accident occurred.

2762. I presume that these naked lights are rather a serious matter. I do not know whether your Lordship looks upon it as a serious matter, but would you consider it consistent with your duties actually to refuse a licence if a manager of a theatre persisted, contrary to your regulations, in burning naked lights night after night?—If complaint were made, say a second time after I had given him that order or suggestion to guard dangerous lights, that he did not attend to it, then I certainly should not grant him a license when he next came for it; or at all events I should grant the license only for the time I mentioned just now, say three months.

2763. Your inspector always sees that there is a proper supply of water?—He does actually see to that matter in the month of August or September, when he goes round; he actually sees that there is a supply, but from not having staff enough to go round constantly, I cannot say there is always a supply of water kept.

2764. At all events he satisfies himself that the hydrants are in a proper position?—Quite so.

2765. Did I understand you to say that the inspector actually sees the hydrants at work and the hose applied?—I am sure that they have done so repeatedly at different times, being so very anxious that everything should go right; I am sure they would see to that at the time of the inspection.

2766. Have you any means of enforcing upon the managers that they should have behind the scenes in case of a fire some system of organisation for the putting out of a fire, or is that left wholly to the managers themselves?—That is left to the managers to do. In December 1876 I sent a memorandum round saying: "Considering the crowded state of the theatres during the Christmas holidays, and more particularly the large numbers of women and children attending the performances of the pantomimes, the Lord Chamberlain requires that all doors not habitually used for exit, but available as additional means of escape in case of fire or alarm, be regularly opened on every occasion when a performance takes place, from Boxing Day until the 1st of February next. The Lord Chamberlain takes this opportunity of suggesting to managers the prudence of establishing among their staff of servants and attendants before and behind the curtain, some sort of regular system according to which each person so employed shall be told off to his appointed station, in case of fire or alarm, so as to prevent hesitation or confusion on any such emergency, and to facilitate the safe and quiet departure of the audience from all parts of the house by all available means of exit."

2767. This is really what I may call a recommendation from your office?—That is so, the whole responsibility being still thrown upon the manager.

2768. Have your inspectors satisfied you that in every theatre in London this recommendation is acted up to?—I am by no means satisfied of that; I do not think it is sufficiently done; I wish it was.

2769. You have no power of doing anything more than merely writing to them?—That is all.

2770. You have no power of insisting upon a regular fireman being employed?—None whatever.

2771. Are you aware whether your inspector has ever, at night time particularly, looked after this recommendation; whether he has actually had ocular demonstration of its being carried out?—I have had no opportunity of seeing to that since the inspection at Christmas. There was only that one inspection of all the theatres, and since that from time to time we have sent in particular instances, but there has been no regular inspection.

2772. As far as the safety of the public is concerned, I suppose we may take it that you consider this a very important recommendation?—I do indeed.

2773. And you have no opportunity of knowing whether it is acted up to at the present time or not?—That is so.

2774. Do you get regular reports made to you of any slight fire?—It is not upon the regulations, but I think it should be, and I will take care it is so done in future; in point of fact a report always appears in the papers; and if I saw an account of it I should send a man the next morning to find out what had happened, and to procure all the details, and prevent it in future, if possible.

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2775. The only notice you have now is a casual remark in the newspapers?—Yes.

2776. And then you immediately send an inspector to know whether the fire occurred through carelessness or pure accident?—That is so.

2777. I think you laid a little stress on the words, "That with *few* exceptions the managers agreed to your recommendations;" will you tell the Committee what those exceptions are, and whether those regulations which they do not obey are, in your opinion, material or not for the protection of the public?—I may mention the case of the Vaudeville Theatre. I found that the chairs were placed in the gangways, although I had repeatedly before desired that they should not be, I found that the managers of the Vaudeville continued to place them there. I sent, I think, three different times, but still they were there. I then wrote to tell them most decidedly to take the chairs away, or that they need not look to have their license in future on the same terms as other managers. I think that was quite enough; the chairs were withdrawn, and they have not been there since, but I know that chairs will be put there again; the public come and tip the boxkeeper, and human nature is weak, as we see upon the railroads. You cannot get rid of the tipping system, and I know that these chairs will from time to time be placed in the gangways again, but I do not think they will be so in the case of the Vaudeville Theatre.

2778. As you recommend that there should be some system of fines imposed by means of the police for breach of the regulations, I presume those fines would be small even for a second or third offence. Supposing a manager persisted, notwithstanding all the fines, in still breaking the regulations, would you say it should be in the power of the police to refuse his license, or should they communicate to you the number of times which he had infringed the regulations, and that you should act upon what the police had told you?—I think it would be much better that the police should themselves take the managers up before the police, and have them fined. Of course that can only be done under a new Act and a new provision.

2779. But supposing a manager was fined three or four times for the same offence, would you leave it to the power of the magistrates to withhold his theatrical license?—I have hardly looked sufficiently into the question to say what would be the effect of that. I think it would be a great nuisance for the managers to be constantly brought up before a police office, and I do not think it would go on happening. I think if a manager were fined two or three times he would not offend again; at the same time I am not in favour of these very small fines. I saw it stated that fines of 1 *l.* or 5 *l.* might be inflicted. Now by putting a whole row of chairs whenever a successful piece is on and the place is very full, a manager might make a very large sum, and if he is only fined 1 *l.* or 5 *l.*, it would hardly deter him from doing so.

2780. Mr. *Clifton.*] £. 1. a chair would cover it, I suppose?—Yes.

2781. Mr. *Onslow.*] My question only referred to these small fines, but you think if the fine was sufficiently heavy it would be a deterrent?—I would rather impose a greater fine than 5 *l.* upon such an offence. I should say that the Act might prescribe, say from 5 *l.* to 100 *l.*, at the discretion of the magistrate.

2782. With a system of small fines and a power in the magistrates to endorse the licenses, the same as you have now in the case of beerhouses and places where they sell liquor, do you think that would be sufficient to be a deterrent?—I think it would be a most excellent thing to have small fines, and endorsement of the license.

2783. If a manager had to pay fees for inspection so much a year, do you think that he would from the fact of having to pay those fees shift the burden of the responsibility from his own shoulders to the licensing authority? Would he not say, "Surely the responsibility rests on you who impose these fines"?—I do not think that would be the case, provided you continued to throw the whole responsibility upon the shoulders of the manager.

2784. You send your regulations to Covent Garden and Drury Lane Theatres, do you not, even though they are not under your particular supervision?—They have been sent there, and I believe they have been attended to there; in fact I believe they are at many of the theatres all over England and Scotland.

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2785. Mr. Robinson, I believe, has built several theatres, has he not?—He has, I believe.

2786. Do you think it advisable to have the inspection of theatres under the constructor of them, or under an independent authority?—I should say under whoever knows most about it; it requires certainly an expert in the art, and I should, for that reason, not like these district surveyors being appointed for the duty, as has been suggested just now. I think it should be done by somebody who has bent his attention principally to that one subject.

2787. Somebody even who may have been interested in the construction of the theatre?—I think so; I do not think that would make any difference.

2788. I suppose since the fire at the Brooklyn Theatre your inspection of theatres has been much greater than it was before?—My attention has been constantly directed to the safety of the public before and since that occurrence. I may say that, although I have much confidence in my predecessor, still I could not but feel that some of the old theatres were in a very dangerous state. I know he has done everything in his power to make them as good as possible, but still a great many of them are not what you would wish them to be, and a panic might occur at any moment, the same as at the Brooklyn Theatre; therefore, of course, I have been more anxious than ever to look closely into the subject, and to try and avoid such a thing.

2789. Has the invention, which went by the name formerly of "Brannon's Patent," but which is now called "stone felt," ever been brought to your notice for the protection of the wood-work, and so on, of staircases?—I have casually looked into it, but I cannot say that I know anything about it.

2790. Mr. *Ritchie.*] With regard to your Lordship's regulations, and the lights which the honourable Member for Guildford spoke about, namely, those lights which were hooked on at the wings, I imagine lights of that kind would probably come under your sixth regulation, which says, "All fixed and ordinary gas-burners to be furnished with efficient guards; moveable and occasional lights to be, where possible, protected in the same manner, or put under charge of persons responsible for lighting, watching, and extinguishing them;" so that even according to your Lordship's regulation they may be unsupplied with guards, and yet they would comply with the regulations if properly watched?—I think that is the general intention of that regulation.

2791. So that if the moveable lights which are hooked on and sometimes hooked off were protected by some one watching beside them, they would, within your Lordship's regulation, be in fact admissible?—I think so.

2792. But I see you have a regulation following this; No. 7: "The footlights or floats to be protected by a wire guard"?—Yes.

2793. May I direct your Lordship's attention to page 31 of the Evidence, Question 2120. Mr. Henderson, who is lessee of two theatres is asked, "Are your footlights protected by wire guards?" to which he answers, "In neither of my theatres are the footlights protected by wire; I do not think it is necessary; I was not aware that it was in the Lord Chamberlain's regulations"?—I happened to see that, for I read over Mr. Henderson's evidence, and I asked Mr. Ponsonby Fane particularly about that, and he explained that in Mr. Henderson's theatre the lights are below the level of the stage, and that therefore there was no necessity for a wire guard, and not only no necessity for a wire guard, but that it could not be put there, the lights being sunk below the level, and therefore quite out of danger.

2794. Of course that answer required some explanation?—I quite think so.

2795. Mr. Henderson's lights are not protected, because they do not require any protection?—I believe that to be the case.

2796. With regard to the reporting of all fires, your Lordship stated that you would probably see any fire mentioned in the newspaper, but of course a fire may be so small as not to be noticed at all in a newspaper, or indeed it might not be to the interest of the manager that it should appear in the newspaper, therefore it would be a wise thing, would it not, that all fires, however small they might be, should be reported to the Lord Chamberlain?—I quite think so. I believe

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believe the order is already given, although not sent round, that that shall be done in future.

2797. Of course your Lordship would call a fire a fire even although it was put out by a man's cap?—Quite so, and it ought to be reported.

2798. Your Lordship stated that whatever department should be charged with the granting of a certificate you would recommend that the department, if it were a Government department, but not otherwise, should be paid out of the Consolidated Fund or the regular expenditure of the country?—What was not gathered by fees from the different theatres, supplemented, in fact, from the Consolidated Fund.

2799. Do not you think that perhaps the people of Great Britain, other than those who reside in the metropolis, might object to sharing the expense of enforcing regulations which were limited to the London theatres?—No, because as I think I explained, I should like to see all the theatres throughout Great Britain equally inspected before being licensed by the same department.

2800. But if whatever recommendations are made are confined to the metropolis, which, I take it, is part of our recommendation, then perhaps there might be some ground for objecting on the score that I mentioned; that is to say, with regard to payment?—I do not think it would be more so than with regard to the police or any office under the Home Office, or the Board of Trade, or any Government Board.

2801. Are the police in the metropolis paid by the country at large?—No; but there are a great many of the expenses which, as the honourable Chairman will tell you, are met out of the Consolidated Fund.

2802. Of course if that department which had the superintendence of this matter of granting these certificates were the Metropolitan Board of Works, that expenditure would entirely fall upon the metropolis only; I am taking it now purely for the metropolis; if this thing were taken in hand by the Board of Works the metropolis would pay for it?—I suppose that would be so, but I am quite sure that in that case the public would be very great losers indeed as compared with the present system. I feel very strongly upon that point.

2803. Has your Lordship's objection to that suggestion been that it would seem as though the Metropolitan Board of Works were giving orders to the Lord Chamberlain?—That is an additional objection. I only mention that as one of the points against the system; it is not a question of etiquette or dignity. I do not mean that, but there would be inconvenience in a department which was not under Government having anything to do with a department like the Lord Chamberlain's, which is.

2804. But, of course, your object would be to get some certificate to show that, before the granting of the license, the theatre was rendered safe?—That is my great object.

2805. If that were one of your regulations, or one of your conditions in granting a license, I do not very clearly see how it would matter where the certificate came from, if you were satisfied that it came from a source upon which you could depend?—I am sure I should be very sorry to say a word against the Metropolitan Board of Works.

2806. I am not assuming anything about any particular Board now, but if there were some department, whatever it might be, from which you would make it a condition that the applicant should produce a certificate, it would not very much matter what that department was, as long as you were convinced that they were able satisfactorily to perform that duty?—No; if I had complete confidence in that Board. I should have it in the Home Office, and I should have it in the Board of Trade, but I do not think I should have it in the Metropolitan Board of Works for the reasons I stated before.

2807. May I ask what the reason was?—That they are a very numerous body, and they have already too much to do; these district surveyors would have their attention constantly upon other points, instead of always being upon the one thing of the construction of theatres. I think that the duty ought to be confined to men who make it their whole business to look to the structure of public buildings with regard to safety.

2808. Then your objection to the Metropolitan Board of Works district surveyors is that they have already as much as they can do, and that they have not

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the special knowledge which is desirable with regard to theatres, in your opinion?—That is so.

2809. But I presume that any gentleman who was an efficient surveyor could qualify himself in a very short time for this special knowledge?—I do not doubt that.

2810. You stated, I think, that you would go still further than music halls, and that you would include churches and chapels, and all places where large numbers of people were assembled together?—I would.

2811. Would you include large hotels?—I have never thought of that, but it would be certainly a good thing to do.

2812. We have recently had an example of great loss of life by reason of a fire taking place at an hotel?—That is so.

2813. Sir *William Fraser.*] I would ask your Lordship this question, whether in a case requiring such precision, and also such constant exercise of supervision, you would not think it better that the responsibility should rest upon one person like the Lord Chamberlain than that it should rest upon a number of persons?—I think it very preferable; that is one of my reasons for thinking that all should be under one licensing authority.

2814. So that in case of a catastrophe there would be some one in short to look to who was wholly responsible, and not divided among 25 gentlemen, who of course would have very little responsibility in any respect for what occurred?—I think that would be the better system.

2815. I believe that in your Lordship's House at present the Lord Steward has some responsibility for the Home Office, has he not?—That is only an arrangement made during the time that this Government has been in office.

2816. But I assume the duties of the Lord Chamberlain are much greater now than they formerly were, and may I ask you this, do you think the increased amount of duty would seriously interfere with his other duties, if the inspection of music halls were put upon him?—I think it would be impossible for the Lord Chamberlain to undertake all the duties with regard to the music halls.

2817. But as regards theatres you would not think so?—Not if they were confined to the London theatres.

2818. I might mention this: Of course you recollect on the 8th of December 1863 that catastrophe which created a great deal of sensation when a church was burnt at Santiago, in which 2,000 persons perished. Now there was a theatre, whose name I will not mention, where I pointed out that the means of exit were very imperfect, and I was told that at the end of the lease of a shop next door an arrangement would be made to enlarge the exit. I observed that that has not been done. Now, I ask you generally are steps of that sort taken. Supposing the door into the street is of a small width, and there is a shop there of which the lease might be purchased, has the proprietor of a theatre ever been compelled to do that?—There are no means of compelling him; you might point out that it would be a very good thing if the house were purchased, and if the manager did enlarge his exit, but that is all you can do.

2819. In the case I am thinking of, I may say a very strong suggestion was made from your Lordship's office about it, and it was anticipated that the gentleman would comply with the suggestion, but I have looked and there is the shop going on the same as ever, and the theatre is not enlarged at the exit?—That is quite possible.

2820. Do you think that an inspection coming when it was not anticipated is worth 50 inspections when everything is prepared?—Decidedly.

2821. *Chairman.*] There is only one question which I would ask your Lordship in conclusion, and that is that I suppose you would say the employment of a man who had been specially engaged in building theatres was more likely to be successful, from the fact that acoustics have to enter so largely into the history of the architecture of theatres, which ordinary surveyors, district surveyors and others, might not be so much alive to?—Quite so.

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Mr. *Alfred William Maberley*, is called in; and Examined.

2822. *Chairman.*] I BELIEVE you are the Architect employed at Exeter Hall?—I am.

2823. Can you describe to the Committee the situation of the building with regard to the streets and entrances?—I have the plans with me. (*The Witness produced the plans, and explained them to the Committee.*)

2824. That plan which you have shown to the Committee of the groundfloor represents the whole area of the ground plan of Exeter Hall?—It does.

2825. In that plan I see that there is one principal entrance leading from the Strand?—Yes.

2826. That entrance communicates by a corridor with the rest of the ground plan?—It does.

2827. Can you give the Committee the width of that corridor leading from the Strand?—The corridor leading from the Strand is 22 feet wide.

2828. There is another entrance, I believe, leading from Exeter-street into that corridor?—Yes, there is.

2829. Is the corridor leading to that door of the same width?—It is only 10 feet wide.

2830. Is that door leading from the 22-feet corridor into the Strand of the same width as the corridor, or does it diminish in width as it comes to the door?—There are double doors in the centre, and two side doors besides.

2831. So that, practically, the exit represents the whole width of the corridor?—Yes.

2832. What is the width of the door which leads from the 10-feet passage into Exeter-street?—Five feet six inches.

2833. There you have a narrow neck at the end of your passage for an exit?—Yes, it is a double door made to swing.

2834. But it is only 5 feet 6 inches wide, with a passage of 10 feet?—Yes.

2835. The upper hall of itself is approached by a staircase leading from the centre passage?—There are three staircases to the Hall itself from the ground.

2836. Do I understand you to say that two of them form a double staircase leading from the central Strand entrance up to the Hall?—Yes.

2837. And that there are two other separate staircases from other parts of the building to different parts of the Hall?—One staircase is almost at the Strand; you ascend the moment you enter the Hall, and the other staircase is at the eastern end of the building; that is a double staircase, and the other is a single staircase nearer the western part.

2838. What is the width of those staircases?—The width of the first flight is 7 feet; then it divides itself into two parts, and those are about 5 feet 6 inches; that is what we call the eastern staircase; the other staircase has two flights, one on each side, and those are 6 feet each; then, after turning round, they join into one flight, which is 10 feet wide.

2839. And what is the width of the third staircase?—The width of the third staircase is 5 feet 6 inches.

2840. What number of people is the Hall capable of containing when it is full?—About 3,000.

2841. And the exits for those 3,000 people consist of two staircases 5 feet 6 inches and 7 feet wide, and a central staircase which is 10 feet wide, ending in two staircases of 6 feet each?—Yes.

2842. Have you ever tested the time, or can you speak to the time, in which an audience can leave Exeter Hall by those staircases?—Yes; it occupies generally about seven minutes, and very rarely more than ten.

2843. At a time when the Hall is quite full, the people clear away in less than 10 minutes?—Yes, they do.

2844. Is that at a time when they are waiting for carriages at night, or in the day meetings?—At night we make the minor hall a waiting room, and one of the windows is so arranged that it can be taken out and made a doorway, so that they go from there as well as from the west end entrance.

2845. So that you have that beyond the exits you have mentioned?—Yes.

2846. Are those exits on to the Strand?—On to Exeter-street.

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2847. Is there more than one exit that you can avail yourself of in case of a crowd?—There is no other way excepting that they might be able to get into the area through the windows on to the top of some other parts.

2848. But that would not be a legal mode of exit?—Not a legal mode of exit.

2849. Can you tell the Committee what is the construction of the staircases and the Hall also, taking the Hall first?—The construction of the Hall is, I suppose, about as solid as any building in London; it is built of brickwork as regard the walls; the paving and flooring are stone; the three staircases are stone, and the floors are wood very heavily timbered indeed.

2850. In your opinion, it is to a certain extent incombustible?—I do not think it would be possible to burn it, except in two places.

2851. Which are those two places?—One is the organ and the other is a place at the west end, but either of those must be set fire to on purpose to burn, I believe.

2852. What you would represent to the Committee is, that although apparently the number of exits is not very considerable, yet the construction of the building is in itself a safety to the public?—Quite so.

2853. You say that the staircases are constructed of stone; does iron enter very much into the supports of the staircases?—The staircases are of stone up to the hall, or nearly up to the Hall. The two principal ones go quite up to it, and the other staircases are wood and stone, but still they are supported by iron girders.

2854. Are those iron girders covered by any material, or are they left open?—They are solid cast-iron girders under the spandrils of the steps.

2855. You stated, I think, that the two staircases leading up as a central entrance to the Hall, after their first flight, come into two curved staircases?—Yes, one of them divides the curve into two; that is the one you ascend from, and then you turn round (*describing the same*).

2856. Do you consider that these curved parts of the staircase are dangerous in case of panic?—Nothing like a staircase which goes right down from one floor to another without any landing.

2857. Having described to the Committee the construction of the Hall, can you state what the construction of the roof is?—I have a model of it in the room which I can show to the Committee (*producing a model*). This is the roof as it was originally made when it was constructed entirely of wood. In the centre of this was a lantern, which was very much objected to, and it was then altered in this way (*producing a second model*). The centre part was cut out, and pieces of iron boiler plate were put round on both sides, and the principals of the lower work removed.

2858. Now it is principally constructed of wood cased with iron and rivetted together with iron plates?—Yes.

2859. How is the lighting carried out?—By chandeliers and windows on both sides of the room; there is a light in the roof at the west end, and a smaller one in the east, but there are no regular windows.

2860. You have stated that the lighting is effected by gas chandeliers?—Yes.

2861. Are they hanging chandeliers from the roof?—Yes.

2862. In what proximity are they to the wood which you describe as lining the roof?—They must be 25 feet at least from that.

2863. So that there can be no practical danger from the gas acting upon the wood of the construction?—No, the wood is cut away at the top where the tube descends.

2864. I understood you to say that there was a light in the west end, but that I suppose is a day-light?—Yes, it is a dormer light.

2865. It is not gas?—We never allow any lights to go into the roof except covered lanterns.

2866. Can you tell the Committee what appliances you have in the way of hydrants, or otherwise in case of fire?—We have sinks and taps on the different floors, with iron buckets.

2867. But you have no hydrants with pressure as you have in most of the theatres?—No.

2868. What is the size of the tanks as I suppose you would call them, or are they merely sinks?—They are cisterns on the top.

2869. Can you give the Committee an idea of the amount of water which is stored

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stored upon the top in case of fire?—The tanks would hold about 700 gallons or 800 gallons each.

2870. Are they supplied with a continuous supply?—Yes.

2871. You have no appliances beyond buckets, have you, for using this water?—No.

2872. No hose?—No.

2873. Do you consider yourself that that is a satisfactory condition in which the building ought to be left?—I think that unless you are able to put the fire out at once with a few buckets of water, a hydrant is not of much use there.

2874. I suppose you would admit, would you not, that a hydrant with proper hose attached to it, by which you could get water to bear upon the fire, would bring the water to bear in greater volume than buckets would?—Quite so.

2875. Then to that extent the application of water from a hydrant, after a fire arose, would be more effective than a string of people would be handing down buckets?—Yes.

2876. Under these circumstances do not you think the public would have more confidence in the security as against fire, if some such appliances as are generally recognised as being advantageous were used in Exeter Hall?—The roof would be the only place where hydrants would be of any use; we can get to every part with buckets, except the roof, perfectly well.

2877. Would it not take longer to apply buckets than it would to apply hose?—It would.

2878. Therefore you would have all advantage in applying hose?—Yes.

2879. Taking it from the point of view which the Committee have to consider, namely, the question of the protection of the public, do you think the width of the staircases and the passages is as much as ought to be desired in the interests of their safety?—I do not think that any more staircases would be of any use, because the only way in which we could possibly get them would be to send the people down into the existing streets.

2880. What I mean is this, that supposing a fire takes place (and the Committee have been told by almost every witness, that a panic was what created the greatest danger), would not the result of that panic be very serious where you have, as you have at Exeter Hall, only three modes of egress for those 3,000 people; the crush would be through those three exits, the width of which, as you have stated, does not allow of a very large number of people passing; a panic might therefore be very destructive under the existing circumstances of the staircases; whereas if a greater number of staircases or exits were available from the Hall, the crowd would disperse through the different exits, and there would not be the same danger from pressure?—The Hall has been in use for more than 40 years, and we have never had any alarm or any panic yet.

2881. We have heard of the traditional pitcher, but at the same time, looking to the fact of the number of people you are able to seat in Exeter Hall, and also looking to the fact that though there never has been a panic, yet there might be a panic, I would ask whether the 3,000 people could at present get away without some risk of accident in the present state of Exeter Hall?—I do not think they would get away from any theatre or other place in case of panic without accidents; I do not think there is more chance of danger here than elsewhere.

2882. Of course you will admit that the chance of safety is increased by the number of exits which are available?—Quite so.

2883. If you could do away with any chance of a crowd concentrating themselves in a passage, you would do away with one great element of danger?—I do not think that in a place like Exeter Hall you could ever prevent that, with any amount of staircases.

2884. Do you mean to say that it is impossible to make Exeter Hall safe, so as to prevent the destruction of life?—No; the building is so constructed, with the staircases coming down directly into the street, that I do not think that you could make more exits which would be useful; perhaps one more staircase might be made to go from the most crowded part of it.

2885. Is there any means by which you could, speaking as an architect, assist the crowd in the existing building, by constructing other means of egress than

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than those that you have?—It is possible to be done, but it is a question of expense.

2886. Then it turns upon this, that there are means of adding to the security, but it would cost a certain sum of money?—Yes.

2887. But you are not prepared to say that that additional expense would not provide an additional safeguard to the public?—It would be an additional safeguard to the public, but I do not think it is of so much importance as people fancy.

2888. Is that opinion formed simply from the fact that you have never experienced the risk?—I have seen the people go out of the Hall a great many times; three or four times a day sometimes, in the large meetings in the month of May, but I have never seen anything like a panic or confusion.

2889. Mercifully I suppose no cause for that panic has arisen?—I cannot say what would be the consequence in the case of panic.

2890. What the Committee is inquiring into is the safety in the case of accident occurring, and it has been pointed out to the Committee that proprietors of theatres have increased the modes of egress, and have increased the number of passages separating them, so as to take parts of the crowd away to separate doors, and in that way done much to take away the pressure of the crowd, and I wish to ask you as a practical man, whether you do not think that Exeter Hall with its present limited means of egress is unsatisfactory from a safety point of view, and whether you do not think it possible to increase its safety by additional means of egress?—We could build another staircase without doubt.

2891. Could you make additional doors to let people out into the street?—The only one would be the one into Exeter-street.

2892. There might be an additional door made through there?—Yes.

2893. Of course every one of those additional doors would be a means of getting rid of the crowd more quickly?—Yes.

2894. Is there anything else you would wish to point out to the Committee with regard to Exeter Hall upon that point?—No, I think not.

2895. Sir *William Fraser.*] I do not know whether you have thought upon the subject, but I have been told that in case of a panic it almost always happens that the people alarmed try to make their exit by the entrance through which they came in; do you know if that is the case; there have been cases of panic where people have been all rushing for that door and trampling over each other when this door was open?—I think that a man if he is not acquainted with the place generally tries to make his way back by the way he entered.

2896. You have heard that that is the instinct of people, to make for the door by which they came in?—Yes.

2897. I think I understood you to say, that it would not be much use to multiply the staircases, unless you could multiply the doors into the street?—That is the only point.

2898. That however many staircases you may build, unless you enlarged the entrances or increased their number, the additional staircase would not be of much avail?—Quite so. I will explain how we arrange the Hall in cases of meetings (*explaining the plan to the Committee*).

2899. I assume there are few places or rooms in which there are less materials, I might say, for burning than Exeter Hall?—You can scarcely get at anything to burn.

2900. But of course you must be aware that panic arises occasionally from other causes; a woman fainting or screaming, or something of that sort, occasionally has been known to set them off?—I have known women faint very often from hearing the Messiah for the first time with a full band.

2901. Fire is not the only cause of panic?—It is not the only cause of panic.

2902. The suggestion you made of having a number of openings at the rear of the building, so as to let the people out wholesale, as it were, in cases of emergencies, would cost between 2,000 *l.* and 3,000 *l.*?—I should think it would cost quite that, and destroy some of our rooms as a matter of course.

2903. But, architecturally speaking, it might be done?—Yes.

2904. As regards the possessors of property, you are in a position to do that; do I understand the alterations would cost that sum, or the property you would have to buy to do it?—The alterations would cost that.

2905. You

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2905. You have the means to do it with regard to property?—Yes, we should only be building over our own property.

2906. The Committee would be glad to know at what rate Exeter Hall is insured?—There are four different insurances upon it, in four different offices; it is insured for 5,000 *l.* in each, making 20,000 *l.*

2907. But what I meant was as to what rate as regards risk?—It is insured at the ordinary risk; the offices do not make any difference with regard to Exeter Hall.

2908. But there is a great deal of difference made in respect of theatres?—Not in this case.

2909. Would theatres be accepted at the same rate as Exeter Hall?—No; Exeter Hall is insured at a very much lower rate.

2910. Is it insured as a dwelling-house, or what?—As a room for public meetings.

2911. Is it something between the rate of a theatre and of a private house?—Two shillings per cent..

2912. As regards the opening in Exeter-street, could that be enlarged considerably; it is now 5 ft. 6 in.?—Yes, the door could be enlarged.

2913. You could make the doorway 10 ft. wide, could you not?—We could make it 8 ft. 6 in., or 9 ft.; we must make some support for the frames, and so on.

2914. Are the doors made to swing?—Yes, they are made to swing both ways.

2915. Is that safer than opening outwards?—When the people are going out we always fasten the doors straight open.

2916. But in the case of a panic, unless you had some person posted there, might not the doors get fixed?—I do not think it would be possible for them to get jammed; we have always a large staff of policemen, besides our own men.

2917. Have you a drilled and disciplined number of men as regards fire, or is it merely left to the intelligence of the men?—It is left to the hall-keeper and his staff.

2918. In short, in case of a fire, you have no one at each door in the passages whose duty it is to look after them?—The policemen have to see to that.

2919. Have they any special instructions?—They have special instructions.

2920. As to what to do in case of fire or panic?—I do not know whether their instructions relate to fire or panic, but there business is to see that the people get away from the door as soon as possible.

2921. We know that on board ship in case of fire everybody is at his place, and knows precisely what to do; there is nothing of that sort?—No.

2922. But with regard to those very material enlargements, they would be feasible but very expensive?—Very expensive.

2923. Mr. *Hardcastle.*] Exeter-street is on the west side of the building, is it not?—It is.

2924. And there is now an exit into Exeter-street?—Yes.

2925. What is the width of the passage from Exeter-street?—Ten feet.

2926. But that of itself is only 5 feet 6 inches?—It is only 5 feet 6 inches.

2927. Then as regards the street at the back of the buildings, what is that called?—Exeter-street too.

2928. Does Exeter-street turn the corner?—Exeter-street turns the corner.

2929. Do you suppose there would be any great difficulty or expense, beyond the sacrifice of the rent, which might be necessary to supply the porter with another room, in making a fresh entrance into that part of Exeter-street?—It could be done certainly by giving up that one room, or any one room on that side, excepting the minor hall.

2930. It could be done, I suppose, at small expense, except as regards construction?—We should require a sort of bridge across the area, and so on.

2931. Would not that be a very considerable addition to the means of exit?—Not much. I think it would be very inconvenient to carry out.

2932. You do not think that the stream would be at all likely to set in that

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direction in case of a rush?—I think the chances are that we should get a cross block. Some would be running one way and some another, that it would do more harm than good at that part.

2933. Mr. *Hayter*.] What distance is Exeter Hall from a fire brigade station?—I think the nearest one is in Chandos-street.

2934. Do you know what distance that would be from Exeter Hall?—I should think it is not more than a quarter of a mile.

2935. Are any precautions taken to watch Exeter Hall at night?—Yes, there is always a man in it.

2936. In your opinion could a fire break out at all without being noticed either by day or by night?—No, certainly not.

2937. There are no inflammable materials in it I understand you to say?—No, there are not.

2938. You do not think that the building itself would burn rapidly?—I am sure it would not.

2939. Could your attendants in any way be drilled to act in particular posts in case of a fire breaking out; have you a sufficient number in the first place?—No, we have only four regularly on there, and sometimes only three.

2940. I suppose if you think that buckets and sinks are sufficient to put out a fire in the building, it is not necessary for the servants to have any special drill, because anybody could apply buckets?—We never think about any danger from a fire because it scarcely could exist; nobody is allowed to go over the building without a lantern, and we do not allow any candles or anything of the kind to be used.

2941. But when anything is going on there, there are gaslights, are there not?—Yes.

2942. And are those well guarded?—Yes.

2943. To sum up, in fact, what you wish to say in regard to the Hall is that it is not likely to catch fire, but that you think a little additional provision might be made?—At considerable additional expense.

2944. Mr. *Young*.] You have a good many meetings at Exeter Hall during the day time, have you not?—Yes.

2945. And concerts at night?—Yes.

2946. During the day do you use any artificial light?—None whatever.

2947. You consider that your security is very much greater than that of a theatre, because there are no properties kept there?—There is nothing to burn.

2948. What have you got underneath you?—Wine cellars.

2949. And spirits, I presume?—In very small quantities I believe; it is principally wine.

2950. But it is occupied by a wine and spirit merchant, is it not?—The parties call themselves so; one of them is a spirit merchant.

2951. Is there more than one occupant of the basement?—The cellars are let out in two divisions.

2952. Both to the same trade?—Yes.

2953. Has that been the case for many years?—I believe it has ever since the Hall has been built.

2954. Practically, you have not found any danger to arise?—No; the vaults are arched over with brickwork, and nothing can do any harm there.

2955. During your experience has there been any fire in the vaults, although it has not extended to the upper part?—There has not.

2956. *Chairman*.] I understand you to say that the vaults are all of fire-proof construction?—They are all of fire-proof construction.

2957. Sir *Henry Peek*.] How many feet is the level of the floor of Exeter Hall above the Strand?—Twenty-four feet.

2958. And how much above the level of Exeter-street?—Only three or four feet less than that.

2959. Can you tell us how many steps there are up from the Strand to the Hall?—About 20, with one landing between; and then 27 to floor of Hall. These stairs are in two flights from the Strand entrance, the length of the steps being 6 feet 9 inches; they then enter upon a landing, from whence the steps are again continued to the floor of the Hall; these steps are 10 feet 6 inches wide, divided in the centre by a double handrail.

2960. And from Exeter-street to the Hall?—From Exeter-street there would be three or four less.

2961. Will

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2961. Will you tell us, if you please, what the railings are made of; if I understand you rightly there are a number of staircases with railings to them?—Yes; the stairs are bounded by iron balustrades with mahogany hand-rails.

2962. I suppose that would be sufficient for any pressure?—They have been supported recently; we have put up some stays to them to make them stronger.

2963. Were they not sufficiently strong before?—A great crush might have knocked them down before.

2964. And if they had been knocked down some people might have fallen through and been killed?—No; they could not have fallen through, I think, because the space is not wide enough.

2965. How do you warm Exeter Hall?—We do not warm it at all except by gas.

2966. Do you mean to say that if you had a large meeting, or what you expected would be a large meeting, in mid-winter, you would not warm it at all?—No; we do not warm it except by gas.

2967. Gas is the only means you have of warming it?—Yes.

2968. Mr. *Onslow.*] Is Exeter Hall the property of a company, or does it belong to a single individual?—The proprietors are a society composed of about 150 members now.

2969. I suppose from time to time they have meetings amongst themselves?—The directors meet every month.

2970. Has this question of protection to the public ever been brought up at any of those meetings that you are aware of?—Yes, once or twice.

2971. You have thought it your duty, as their architect, to point out, I will not say that in my opinion, but I will say that in your opinion it is not, at all events, a very safe building as regards protection from fire?—I think it is quite as safe as any building in London. Frequently, but not so much as to safety from fire as convenience of exit for the audience to reach carriages.

2972. I believe that people going out when a meeting is over must all converge at a certain point?—They must go out into the Strand, or else into Exeter-street.

2973. Practically, they must all converge at a certain point from the two galleries?—No; the east and west galleries have different staircases.

2974. In the case of panic, have you ever pointed out to your committee how unsafe that would be?—I believe the committee are of opinion that it would not be so.

2975. That it would not be unsafe for all the people to converge, in case of panic, at a certain point?—They consider the appliances for allowing people to go out of the Hall are sufficient.

2976. But it is the fact, that all must converge at a certain point from the galleries, as you have described?—At two points.

2977. You have no water laid on over any part of the building, have you?—Yes, we have taps in various places.

2978. But you have no hydrants?—No hydrants.

2979. No hose?—No hose.

2980. No telegraphic communication with any fire station, and no alarm bell?—No.

2981. You have only buckets?—That is all.

2982. Are those buckets always kept full of water?—About half the buckets are always kept filled, and the remainder ready for filling.

2983. Those buckets are not filled with water; how far are they from a supply of water, in case they may be wanted?—Twelve or 13 feet.

2984. Is there no one particularly appointed to fill those buckets with water, in case of a fire, or is that left to haphazard?—Everyone would be supposed to do what he could.

2985. Is there anyone in particular who is deputed to do so?—No.

2986. Then it would be left to chance who filled those buckets?—It is left to those who are in the building.

2987. It is no one's duty to look after the buckets, is it?—The hall-keeper would do it? it is his duty to do so, and his staff.

2988. How far would the hall-keeper be from the buckets?—He would be about 35 feet from the buckets.

2989. From the nearest buckets?—Yes.

 2990. I may

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2990. I may take it that he would have to go in case of fire through a dense crowd to get to the buckets, if he ever got there at all?—Unless he happened to be close to the spot he would.

2991. An honourable Member wishes me to ask you whether your buckets are made of wood or of leather?—They are made of iron.

2992. Do all your doors open outwards or inwards?—They open both ways.

2993. But when the Hall is full of people are they left open?—They are open towards the street then.

2994. Have you to get an annual license?—I think so.

2995. From whom, from the magistrates?—The license is from the Middlesex magistrates.

2996. You have no theatrical performance at Exeter Hall?—No.

2997. Are you aware whether Exeter Hall has ever been structurally inspected by any particular architect, as regards protection from being burnt down?—Yes, it was inspected I should think about two months ago; the surveyor to the police came, I think, by the order of the Lord Chamberlain.

2998. To inspect as regards its structure?—As regards our means of ingress and egress and stairs; he measured all the stairs and took a great number of notes.

2999. Was there a report made?—I should think so.

3000. Have you ever seen that report?—I have not.

3001. Do you know whether any report has been made?—He must have made a report, but I do not know that it has ever been published. He went to the theatres at the same time.

3002. I suppose you are of opinion that in case of fire, even though there were no particular danger, yet the fact of the people seeing a light might cause a great panic?—I do not think there is anything more likely to happen in the way of panic at this place than in any other. Speaking for myself I know that I would much rather be inside in case of panic than I would in any theatre.

3003. You have night concerts you have stated?—They are over a few minutes before 11 o'clock.

3004. Have you any footlights?—No.

3005. With regard to the insurance of the building, you say you do not think it is high compared with theatres?—Two shillings per cent.; theatres, I believe, are 21 *s.*

3006. At all events it is your opinion that the insurance is low, because the structure of the place in your opinion is almost fire-proof?—Yes; and on account of the pains we always take to prevent anything happening.

3007. But the lowness of the insurance has nothing whatever to do with a panic?—No; I may say that I think our insurance, as far as I am aware, is the same as that of an ordinary dwelling-house.

3008. Have you any means of laying down hydrants in the Hall; could you do so if you had them?—Yes, we could do that.

3009. And also of supplying the usual appliances, hose and so on?—Yes.

3010. That would be no great matter of expense, would it?—I had an estimate made some time ago, and I think it came to something like 300 *l.* or 400 *l.*

3011. Do you not think that, considering what a protection that would be, it would be well worth the money?—I do not think it would be very effective. I think it would be more the idea of the thing than anything else.

3012. You mean that it would not be very effective in putting out a fire?—I think not.

3013. Mr. *Forsyth.*] You stated just now that the meetings were in the daytime; but are there not a great many meetings that take place in the evening?—Yes. The great hall was used 44 times, including mornings and evenings, last year.

3014. I want to call your attention to this: You know the platform, the place where the speaker stands; behind that there are ascending benches which hold, I suppose, about 500 people at least. Now, the only means of egress from that place is by two narrow passages going down stone stairs, one on each side; they are like tunnels. Now, supposing there were a panic, I do not care whether

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whether there were a fire or not; but supposing there were a rush to get from the orchestra, would not there be a great danger of loss of life from the pressure of the crowd?—There are two series of steps on the front of the orchestra fronting the Hall, and two others higher up; those are specially for the performers.

3015. *Chairman.*] I wish to ask you a question with regard to an answer you gave to an honourable Member; you stated that buckets were used, and that there were no regulations under which those buckets were ever tested to see that they were in a proper condition?—No; we had them down the other day to look at them.

3016. There is no system under which your officers work of testing and using those buckets to see whether they are leaky or not?—No.

3017. Practically you leave them hung up there until this unfortunate accident of fire comes, in the hope that they will then be useful?—Perhaps that may be said; but half the buckets are always kept filled.

Mr. *George Vulliamy*, is called in; and Examined.

3018. *Chairman.*] You are the Superintending Architect of the Metropolitan Board of Works, I believe?—I am.

3019. Can you describe to the Committee the operation of the Metropolitan Building Act, the 18 & 19 Vict., under which the Board have the power of inspecting buildings?—The Metropolitan Building Act is administered by 62 district surveyors, part of whom, 43 in number, have been appointed by the Board, and 19 were appointed by the justices prior to the Board's existence. I can state the process if the Committee wish me to explain how the matters are arranged.

3020. I wish the Committee to be in possession of the fact as to how the work under the Metropolitan Building Act is carred out by the surveyors?—It is the district surveyor's duty, under the Building Act, to superintend the erection of all new, and the alteration of all old, buildings of every description, and the first process is under the 38th section of the Act, which consists in the builder of a building to be altered or erected giving the district surveyor two days' notice before he does anything, and also supplying him with all the particulars of the proposed works; they are then carried on under the direction of the district surveyor, and on the completion of them he receives a fee for looking after them, but beyond that there are certain regulations under Section 22 and Section 30 for public buildings.

3021. What are the regulations under Section 22?—The section says: "The following rules shall be observed with respect to accesses and stairs: In every public building, and in every other building." A "public building," as defined in the Interpretation Clause, "shall mean every building used as a church, chapel, or other place of public worship; also every building used for purposes of public instruction; also every building used as a college, public hall, hospital, theatre, public concert-room, public hall, public lecture-room, public exhibition-room, or for any other public purposes." "In every public building, and in every other building containing more than 125,000 cubic feet, and used as a dwelling-house for separate families, the floors of the lobbies, corridors, passages, and landings, and also the flights of stairs, shall be of stone or other fire-proof material, and carried by supports of a fire-proof material."

3022. Let me ask you with regard to that: the words are that they shall be of "stone or other fire-proof material, and carried by supports of fire-proof material"; have the district surveyors got any rules which guide them as to what constitutes fire-proof material; by that question I mean that the Committee have had before them two or three different modes of construction, all of them called fire-proof, one in which iron and stone enters into the composition, and the other in which a material such as concrete is used, and then what Captain Shaw has put before the Committee, that wood practically is the safer material for fire-proof construction, and lastly brick arches?—There is no doubt whatever that the safest fire-proof construction is brick or concrete.

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3023. Do your district surveyors interpret the meaning of this 22nd section, that they shall be fire-proof as by the brick-arch construction?—There has been a great difference of opinion as to what is fire-proof. We have for years past looked upon stone and iron as fire-proof, but we are now very much inclined to question it.

3024. Do the district surveyors each act upon his own idea of what is called fire-proof construction?—Yes.

3025. So that you may have what is called fire-proof construction in one building of stone and iron, and another of brick arches?—Yes.

3026. Now will you read Section 30?—Yes, the section says as to the construction of public buildings: "Notwithstanding anything herein contained, every public building, including the walls, roofs, floors, galleries, and staircases, shall be constructed in such manner as may be approved by the district surveyor, or in the event of disagreement may be determined by the Metropolitan Board; and save in so far as respects the rules of construction every public building shall throughout this Act be deemed to be included in the term building, and be subject to all the provisions of this Act in the same manner as if it were a building erected for a purpose other than a public purpose."

3027. There again I see the district surveyors have power to deal with the construction of the staircases, but I suppose that varies very much with your district surveyors?—Very many surveyors have difference of opinion as to what is fire-proof material.

3028. But the construction of staircases is an important question in the erection of public buildings, and what I wished to arrive at by my question was this, that the district surveyors are each paramount in their own districts; they may have each an idea of what is suitable for public building staircases, and it is only complaint as against them that it comes before the central authority?—That is so.

3029. Do you think that that is a satisfactory condition of things, or do you think the central authority ought to have a direct power of making regulations with regard to construction?—I think it would be a great improvement if the Board had the power of laying down what they considered proper rules for fire-proof construction.

3030. So that if public buildings were certified as secure by the district surveyor, the public would be satisfied that they were all upon a given plan which had gone through the test of experience?—That would be very desirable.

3031. I think in 1873 and 1874 some difficulty arose as to the construction of the theatre of which the Committee have heard a good deal, namely, the Criterion Theatre; can you describe that to the Committee?—There was a difference of opinion between the district surveyor and the builder as to the thickness of the walls under the Act, after which it came before the Board under the 30th section, which I have just read to the Committee, and on making two or three very careful surveys of the building the Board ordered the report which I made to be carried out.

3032. May I ask did that report carry out the district surveyor's report in full or did it vary it?—It varied it.

3033. So that in that case you had evidence that where there was a difference between the constructor of a theatre and a district surveyor, the district surveyor really was in fault?—Quite so; it is the case sometimes.

3034. That strengthens the argument in favour of having one set of construction rules and one authority to carry them out generally?—Yes.

3035. Did the means of ingress and egress form a part of the difficulty with regard to the Criterion Theatre?—It was mentioned in the investigation, but the inquiry was purely under the Building Act.

3036. Under the Building Act had you no power to lay down rules with regard to the means of egress from public buildings?—We have; it is prescribed that they shall be all fire-proof, so that the public shall have a safe exit.

3037. You have no power that the Lord Chamberlain has, of saying that you will refuse a license unless a certain number of rules are complied with?—No, we have no such power.

3038. All the power which the Metropolitan Board of Works and the district surveyor have, is in regard to the construction of the passages, that they shall be

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be of fire-proof material?—The passages, galleries, corridors, and public approaches shall be fire-proof.

3039. But you have no power of laying down that a certain number shall be constructed, if there is a given number of audience?—No, there is no power to do that.

3040. Do you think that that should be one of the rules that should guide you as to the construction?—I should think it was one of the most important rules.

3041. In fact in dealing with public buildings, the number of exits is practically one of the most important things which can arise?—It deserves the first consideration.

3042. Therefore any fresh authority which might be set up, having power to deal with the construction, should have greater power with regard to making regulations than they at present possess under the Metropolitan Building Act?—Certainly they should; that is my opinion decidedly.

3043. I think you very recently had a case in which you had a difference of opinion with the builder?—We had a difference of opinion between the builder and the surveyor only the other day with regard to an assembly room in the Wandsworth district; the matter was brought before the Board's attention, and I reported to the Board what I thought was necessary to make the construction safe. It was done publicly in open Board. The district surveyor and the builder were called forward, and they bowed their acquiescence in it, and there the matter ends, and the Board's order will be carried out accordingly.

3044. I should like to ask whether in any instance the alterations made by the Board were alterations on the side of safety, as against the district surveyor, or as against the builder?—They were alterations agreeing with the district surveyor, and against the builder.

3045. That is to say, the district surveyor had differed from the original builder upon the grounds of safety, and the Board maintained the district surveyor's report?—Yes.

3046. I think you heard Mr. Ponsonby Fane's evidence before this Committee?—I did not hear it, but I have read it.

3047. Do you agree with Mr. Ponsonby Fane that if a proper authority is to be set up to which the construction of theatres and other places of public amusement is given, that authority should be a Government department, such as the Board of Trade, or a department attached to the Lord Chamberlain's office?—I should say it ought decidedly to be the Metropolitan Board of Works, who are now responsible to the public through their district surveyors for everything that is done in the shape of building in London, either in the alteration or building of public and private buildings; everything must come under the district surveyor's attention.

3048. But whilst saying that, you still say that the whole system wants remodelling, inasmuch as those differences of opinion which arise at present upon the decision of the district surveyor as against the builder, ought to be settled under the same authority?—It certainly requiries remodelling, and I should propose to do that by making the Board the first authority to appeal to instead of the district surveyor.

3049. Would you propose that in all new buildings the construction should, as a matter of course, go before the Metropolitan Board of Works in the first instance?—All new public buildings, theatres, lecture halls, and concert rooms, &c.

3050. That as far as the construction of all new public buildings is concerned, the Metropolitan Board of Works should in every instance satisfy themselves as to that construction, and that the district surveyor should only be the instrument of seeing that the plans were fully carried out when so approved?—That is my opinion entirely.

3051. Mr. Ponsonby Fane and the Lord Chamberlain both thought that a Government department would be advisable in preference to the Metropolitan Board of Works: first, because, as they stated, the Metropolitan Board of Works is a many-headed Board; and, secondly, because they proposed that this authority when set up should deal with the construction of theatres generally all over the country as well as in the metropolis; of course the Metropolitan Board of Works could not do that?—It could not.

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3052. If it were contemplated that the whole country, as far as regarded the construction of public buildings, should come under one department, it must of necessity be a public department?—I think so, certainly.

3053. Supposing it were limited to the metropolis, and your suggestion as to the Metropolitan Board of Works being the authority for construction were carried out, do you see any difficulty in placing the licensing under the Lord Chamberlain, together with the constructive authority in the Metropolitan Board of Works?—I cannot see the slightest difficulty, for this reason, that the Metropolitan Board of Works would be answerable to the public for the construction and safety of the buildings from fire, and after the certificate of the Metropolitan Board of Works is given that need not in any way clash with the Lord Chamberlain's certificate, which would be a certificate with regard to morality and other minor arrangements of theatres, and then we have at hand, as I may inform you, this large staff of district surveyors, who are men highly competent; they are all selected from the profession after a severe examination by the Royal Institute of British Architects, and then they undergo a careful selection by the Board, who take great pains to select the best men; we have perhaps 20 or 30 up at every election; some of the district surveyors are the first men in the profession; two are professors. Professor Donaldson, for example, who held for many years the professorship to the London University in Architecture, and we have also Professor Kerr, the Professor of Architecture at King's College.

3054. And you would represent that the knowledge which is required to secure the safety of the public in theatres is a matter which does not require any particular experience?—No, I do not think so.

3055. That being qualified in that way, to see that the work was carried out according to the regulations which were laid down, you would ensure that all the public buildings were really modelled on the same plan of safety as the Metropolitan Board of Works, through its own surveyor, would have certified as to the construction in each case?—I think so.

3056. And that then the Lord Chamberlain's authority would begin, because his licence would issue, and the regulations he laid down would be enforced under his authority?—Quite so, and quite distinct from the authority of the Board.

3057. To what extent would you carry this; would you make this constructive authority of the Metropolitan Board of Works responsible for the construction of all places of amusement, such as music halls as well as theatres?—They would be responsible for all public buildings, including churches, chapels, schools, or places where people congregate in large numbers.

3058. You would give them the power of ordering a certain construction in new buildings, and ordering the alteration of old buildings, up to a given standard of safety?—Certainly I would; that is my view entirely.

3059. That would, of course, imply widening staircases, providing a number of doors sufficient for the number of the audience, the gradients in the steps, and the fire-proof construction of passages, and the separation of the passages?—Certainly all those points would have to be carefully considered; those are the principal points we should have to regard.

3060. It has been suggested, which, of course, is impossible, that the Metropolitan Board of Works might be abitrary in this matter; would you give any appeal against the Metropolitan Board of Works upon the point of construction?—If that difficulty were felt they might apply to the Secretary of State, or the Council of the Royal Institute of British Architects, who are all very eminent men.

3061. But at present, I suppose, there is no appeal from the decision of the Metropolitan Board of Works surveyor as to the construction of a building, is there?—None whatever.

3062. Therefore you do not think there would be any necessity for an appeal in those cases?—I have had the honour to be the adviser of the Metropolitan Board of Works in my profession for more than 16 years, and I have never known a case in which there has been any necessity for an appeal.

3063. Do you see any necessity for requiring this construction certificate in all cases of music halls, which Mr. Pownall stated were so numerously attached to public-houses; I am not talking of the larger buildings, concert rooms and so on, but of those rooms attached to public-houses which are at present licensed by the

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the magistrates for music, where 20 or 30 people come together occasionally, would you require the same constructive certificate with regard to them?—If there were any gathering together of over 50 people there should be a certificate of construction from the Metropolitan Board of Works.

3064. Are you aware that difficulty arises with regard to public-house licenses in this way, that the magistrates are very jealous of allowing any number of entrances to a public-house, and that consequently the regulations which the Metropolitan Board of Works might lay down as to exits for a music hall would at once take away the license from the public-house; but would you think that might be got over by saying that where only a limited number were supposed to be assembled together, such a certificate would not be required?—I think that would be the best way to get over the difficulty. I am aware that the magistrates do not advocate many openings or entrances into public-houses.

3065. I believe there was some attempt made, was there not, in 1874 to amend the Building Act?—Yes, there was an Amended Building Act proposed, in which a great deal relating to this subject was introduced.

3066. Did that Bill ever come before Parliament?—It was before a Committee, but it never was made law.

3067. It was referred to a Select Committee?—Yes.

3068. That Bill contemplated great additional powers with regard to security, did it not?—It did; the width of stairs and lobbies, corridors, passages, and means of ventilation, and so on, which are not in the present Building Act; but these, as I say, never became law.

3069. Will you tell the Committee what was the reason for its not passing; was there any great opposition to it?—Great opposition arose from the building trade and other manufacturers in a large way of business.

3070. The building trade objected, I suppose, to greater powers being given to the Metropolitan Board of Works over their business?—I think that had a great deal to do with it.

3071. At the same time you would represent that the Board have not lost sight of this fact of construction, inasmuch as they did in 1874 attempt to deal with it?—They did very strenuously.

3072. Supposing this power were given and the Metropolitan Board of Works were made the authority, have you thought at all whether the power of inspection of those places should be granted to the department?—The power of inspection, I suppose, should follow as a necessary course to the officer of the Metropolitan Board of Works, and after that, if necessary, periodical inspection by the district surveyor in whose district the building was erected.

3073. That would be essential for the sake of seeing that the construction which was originally sanctioned was not in any way altered to the prejudice of the public?—To see that it was all carefully carried out and not altered.

3074. Would you give power to the Board to punish with police penalties any infringement of such regulations, or would you leave it simply with the power of recommending the licensing authority to suspend the license for the future?—Perhaps the best way would be to suspend the license for the future until the proprietors acquiesced in what we required.

3075. You do not think that there would be any difficulty arising from the fact of there being two authorities, one authority wishing to punish and the other authority taking a different view of the matter, and therefore in your not being able to enforce in any way the conditions which you had made necessary and which your inspectors reported to you had been neglected?—There would be some difficulty in that way; I have not considered how that might be got over.

3076. Do you think it might be got over by making, as has been suggested to the Committee, the infringement of the recommendations a matter on which police penalties could be recovered from the manager, and which would be recorded upon his license, which would be produced against him when he applied to the Lord Chamberlain or the justices for a renewal?—I think the suggestion of recording it upon the license is a very good one.

3077. I think that some witnesses go so far as to say that after a certain number of records upon the license the authority might go to the length of suspending it; would you agree with that suggestion?—I think that would be a very valuable suggestion.

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3078. In that way the Metropolitan Board of Works would gain a means of enforcing their rules which would be satisfactory?—I think so. But would the Committee allow me to mention that the penalty under the old Building Act of 1844 was a very severe penalty indeed; it was that for using a building not properly certified the offender should forfeit a sum not exceeding 200 *l.* a day. It was looked upon as a very heinous offence.

3079. What are your penalties now?—I really do not know that we have any.

3080. But you would represent, if you had the obligation thrown upon you of certifying as to construction, that you should have some power of enforcing the maintenance of that construction after the license had been granted upon certificate?—Quite so,

3081. I suppose there is another advantage which you would put to the Committee, in the Metropolitan Board of Works having some control over the construction; that is, that the Metropolitan Board of Works are at prerent entrusted with the command of the fire brigade, and you would have the advantage of Captain Shaw's assistance and advice with regard to the question of fire in the construction of the building?—It would be a very great advantage to us to have the opportunity of consulting Captain Shaw on any occasion on which we had a difference of opinion. I should certainly take his advice if the building were referred to me.

3082. Is there any other point which you would wish to place before the Committee in your examination in chief?—I would only wish to hand in a list of the district surveyors, and the method of dividing London into districts. (*The same was handed in.*)

3083. Those gentlemen are as you have described them each entrusted with a particular area?—Yes; the area allotted to each is marked on the side.

3084. And all buildings are inspected by them either in alteration or in construction?—Every building in London.

3085. But as you represent the Building Act does not go far enough to give you complete power to lay down what you consider full regulations in case of fire in public buildings?—It would be very much better if the Board were supreme instead of there being an appeal to the Board only in case of difference of opinion.

3086. You would represent that a survey by the Board in the first instance would be the better means, because one plan would then be adopted universally, and you could ensure, even if it were wrong, that it would be only one wrong crochet instead of a number of crochets?—Quite so; you would not have 62 different ideas of what a fire-proof construction is, as we might have now. I am speaking only of public buildings, of course.

3087. You would not propose to alter the power of the Board with regard to private buildings?—Certainly not, only with regard to public buildings.

3088. You say you would include buildings in which a large number of people congregate, and you would place a limit on the number as to which you would say they should have a right to be protected, as far as their numbers are concerned by the authority?—Quite so.

3089. Mr. *Onslow.*] I wish to ask you a question with regard to those new buildings which are set up in London. We have it in evidence that they are now building so very high that the pressure of water supplied is not sufficient to protect the upper storeys of those houses in case of fire; is there any limit in the metropolis of the height to which warehouses or other houses can be built?—Not in streets which are over 50 feet in width.

3090. No limit whatever?—No limit whatever.

3091. Is it possible, structurally speaking, to build warehouses and storehouses even higher than they are at present?—Structurally speaking, if you make the foundations and the walls strong enough, you might build them 150 feet high. For instance, there is a hotel to be built in Northumberland Avenue, near the Strand; I have no doubt whatever that that building will be carried up 100 feet.

3092. Of course in order effectually to protect the top story of such a building from fire, the pressure of water would require to be very much larger than it is at present, would it not?—I do not think that any of Captain Shaw's appliances would reach that height.

3093. Sir *Henry Peek.*] Do I understand you that you would like to have a regular inspection of all the public buildings at intervals?—Certainly.

3094. Whether

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3094. Whether alterations were needed or not?—I should certainly wish if the Board were to be the authority, that they should have the power of inspecting all public buildings at any time they choose through their officers.

3095. You have heard the evidence with regard to Exeter Hall, have you not?—I heard it imperfectly. Mr. Maberley hardly spoke loud enough to be heard where I sat.

3096. Mr. Maberley seemed to think that Exeter Hall was very safe, but other witnesses seem to think it is a very dangerous place; what is your opinion with regard to it?—I think that every place is very dangerous where there are so few exits; coming straight down 30 or 40 steps into the street in case of a panic, I should say was a most dangerous thing; but I should think there is a more dangerous place, that is St. James's Hall, and the Egyptian Hall still worse.

3097. Has the construction of these buildings ever been under the consideration of the Metropolitan Board of Works?—They have never been under the consideration of the Metropolitan Board of Works since I have been at their office.

3098. I thought you stated a moment ago that whenever there was an alteration they were bound to give notice to the district surveyor, who, in fact, is an officer of the Metropolitan Board of Works?—Yes; that notice, no doubt, has been given in every instance to the district surveyor, but it did not come before the Metropolitan Board of Words, because there has been no dispute between the district surveyor and the builder as to how the alteration or the building should be carried out.

3099. Are you always satisfied with the district surveyors' reports?—They do not report to us. The district surveyor calls upon the builder to do such and such things; then, if he will not do it, they come to the Board.

3100. Do I understand that the district surveyor is practically omnipotent?—He is; that is why I say that the public buildings, in my humble judgment, should be under the Board itself, and go to the district surveyor after the Board had certified to the plans.

3101. Would not it be competent for you, in the case of such a building as Exeter Hall or St. James's Hall, to say to the district surveyor, Now before you give your consent to any alteration, we wish ourselves to be consulted?—That would be irregular.

3102. But you are the masters of the surveyors, are you not?—Yes; but the matter may never come before our consideration at all. If an alteration is going to be made in St. James's Hall, the builder is bound to give to the district surveyor 48 hours' notice of the alterations he intends to make; the works are then proceeded with, and if the district surveyor is satisfied that the works are right as regards construction, and for the safety of the public they are carried on and are certified, he gets his fee, and we never hear anything at all about it, except seeing the tabulated form of fees, which I find in my office, which shows that the district surveyor has received some fees on account of Exeter Hall.

3103. You think that the safety of the public in such buildings as Exeter Hall and St. James's Hall is really dependent upon the district surveyor?—It is now.

3104. Do you think that is a right state of things?—No, and that is the reason why I propose that the Board should be the first authority. The Board has the power of consulting Captain Shaw and any other authority they like, and, after hearing everything, they can determine what is best to do and give their certificate, and then they could hand the matter over to the district surveyor to see the works carried out. In my judgment you have struck the weak point exactly about the district surveyor.

3105. I suppose it would not be altogether an impossible thing to square the district surveyor, would it?—They are such honourable men that I do not think anybody could square them. I know them all; they are selected from the *élite* of the profession.

3106. Do I understand that any and every building in the City is required to be certified by the district surveyors appointed by you?—Exactly so; they are all appointed by the Board.

3107. The City has no independent authority in the matter?—No independent authority as regards the Building Act, except as to surveying dangerous structures.

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3108. Mr. *Stewart Hardy.*] I understand you would propose not only to license the building on its erection, but to give the power to the district surveyor to inspect from time to time?—I would.

3109. Would that be with regard to the constructive part of it or with regard to the swinging of the doors, or chairs in the gangways, and the proper covering of lights?—The doors swinging the right way I should think part of the district surveyor's or the inspector's duty, but putting chairs in gangways is a little matter which I should hardly think he could have control over, because that could be done when his back was turned.

3110. Would it not result in this, that you would have the double expense of two different departments?—If you were going to erect a building you would give notice to the district surveyor, and you would pay him his fees for looking after it.

3111. That would remove the most troublesome part of the Lord Chamberlain's office, so that his surveyor would only have to look after the lights?—The lights, dresses, and the *morale* of the thing.

3112. Would you consider a proper supply of hydrants and water to a theatre or a hall like Exeter Hall a part of your duty?—Yes, certainly I should.

3113. Do you think that Exeter Hall is now properly provided, without hydrants or any water supply?—I think it is most insufficiently supplied.

3114. Sir *James M'Garel-Hogg.*] With regard to the Building Act, the Metropolitan Board of Works found several things which required correction?—Yes.

3115. Amongst these did we not have to consider the question of fire-resisting materials; was not that one of the matters brought under the consideration of the Board by Parliament?—Yes.

3116. And beside the fire-resisting materials there was another schedule about fire-resisting buildings, fire-resisting doors, and communications between buildings; those were all in the Bill brought in by me in 1874?—Yes.

3117. Then there was the minimum thickness of walls, the height, and construction of buildings generally?—Yes.

3118. Then with regard to the question you have been asked about, namely, the district surveyor, we found that there was a certain anomaly in their position, and the Board was anxious to remove that anomaly and to make them more officers of the Board?—Just so.

3119. If that had been so, it would have been conducive to the public interest, would it not?—Yes.

3120. Having been the architect of the Board for 16 years, you know what the duties of the district surveyors are?—I do.

3121. Do you think that they are so overworked that they would not be able to supervise the construction of music halls and theatres?—I do not think they are overworked.

3122. You think they would be too glad to have the buildings to look after?—Yes, certainly.

3123. From what you know of the district surveyors, and the examination they have undergone, and the care with which they are selected, do you consider that they are thoroughly competent to look after the construction of theatres and buildings of all kinds?—I think a district surveyor (having been an examiner of them for the Institute of British Architects), if he can pass that examination as an architect, could rebuild St. Paul's, or do any difficult thing which you could put before him.

3124. Sir *Henry Peek.*] Were you the father of the Bill?—Our chairman brought it in, but I helped to frame it.

3125. Sir *James M'Garel-Hogg.*] Do you consider that the district surveyors would require some further special knowledge beyond what they possess as architects, having passed that examination for the purpose of supervising and examining into theatres and public buildings?—Certainly not; I assert, without the slightest hesitation, that any gentleman who has gone through the examination of the Institute of British Architects ought to be perfectly competent to rebuild St. Paul's.

3126. I believe this Bill which I hold in my hand was not passed because the trades of the metropolis considered that the provisions were too stringent, and that is the reason they opposed it before the House?—I think, if I remember rightly, it was upset principally by the building trade; some of the enactments there

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there are very special indeed in keeping them from stowing timber in the streets, which is at the present time done in a very dangerous way, and such other matters.

3127. My object was to show that we were fully alive to all the difficulties of the case, and brought in a Bill to try and obviate them?—Yes.

3128. Then as regards the reporting; supposing that the Metropolitan Board of Works should go and supervise the construction of those buildings, do you think there will be any difficulty whatever in seeing that the buildings were of a safe construction, and leaving the rest of the work to the Lord Chamberlain as regards the performance at the theatres, and the lights and dresses, and all those things?—There would be no difficulty in that whatever; the Board should report as to the safety of the public as regards the construction and fire, and the hydrants, and fire-hose, and let the Lord Chamberlain have the rest of the matter in his hands.

3129. I think, with regard to the Criterion, the Lord Chamberlain's Office and the Metropolitan Board of Works were in communication, and the matter was satisfactorily settled without any difficulty?—Yes, it was.

3130. My honourable friend asked you with regard to the new buildings which will probably be built in the Northumberland Avenue; I think the height and thickness of the walls were among the matters specially mentioned in this Bill?—They were specially mentioned.

3131. And I think another was about the party walls, and with regard to the thickness of them to prevent the spread of fire?—We tried to improve upon that, but unfortunately the Bill never became law, so we remained where we were.

3132. I presume you can say that it would be much less expense to the Metropolitan Board of Works to carry it out, than if a fresh Government department were established for the purpose?—It would cost nobody anything except those who are building, because they would pay the district surveyor the fee as they do now. When the Reform Club was built, the district surveyor was paid his fee of 10 guineas, and he had to supervise the whole of it.

3133. Mr. *Hayter*.] By whom are the music halls now inspected with regard to their safety from fire?—I do not think they come under anybody's notice except they make an alteration, and call in a district surveyor. Then the district surveyor, if he does his duty, would insist, as far as he is able, that a certain security shall be added to the building, but if they are not altered or added to, they may remain for ever as they were when they were first opened.

3134. When they obtain their license, are they not inspected by any surveyor?—I have no knowledge how that is done, but if the district surveyor can find them making alterations, he would say, I must have these passages which you wish to alter all made fire-proof. I can give you an account of what took place lately in Lambeth. The Lambeth Baths in the Westminster-road are used in the summer-time as swimming-baths, and in the winter time as a place for political and other meetings; an additional access was required to those baths and meeting-rooms, and the owner bought a house in the Westminster-road to pull down and rebuild for the purpose; he made an alteration, and left the approach through this house as just an ordinary approach made of wood covered with plaister. The district surveyor brought the owner up, and said, This is an approach to a public building; you must have it fire-proof, and he said he would not. I went down and inspected it, and insisted upon its being made fire-proof, and I had it all made fire-proof, brick walls and arches, and stone floor, and so on, whereas before that it was all left in wood.

3135. Those precautions apply to all public buildings when they are being altered?—Yes; when the district surveyor is called, he says, I will have nothing to do with it unless you make those alterations fire-proof; otherwise they might remain for ever as they were.

3136. Are other buildings, not being music halls or theatres, inspected in any way?—We have nothing to do with the matter beyond the district surveyors.

3137. You are aware that some of the older theatres, as we have evidence to prove, cannot be altered in a way to make them thoroughly secure without rebuilding?—I daresay that is the case in many of them.

3138. You would not give a compulsory power to the officers of the Metropolitan Board of Works to pull them down?—No; but still it is a very salutary effect; if when they make an alteration they are called upon to make a fire-

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proof construction instead of an inflammable one; that is the utmost we can do.

3139. I was speaking rather with regard to exits and the width of passages; you say they could not do that in some of the old theatres without making a great structural change?—In the old theatres like Drury Lane, I do not think you could alter them in any way.

3140. *Chairman.*] I wish to ask whether you are aware of what was stated by Mr. Villiers, of the Canterbury Hall, that magistrates do inspect with regard to new buildings which apply for music-hall licenses under the new Act?—I was not aware of it until I heard him say so.

3141. The magistrates inspect really on the granting of the license for wines and spirits?—So I understand from him.

3142. In that way under new licenses they have a certain power of inspection?—Yes.

3143. But a more satisfactory one would be the one you have suggested?—It would cost nothing, and we have a competent staff ready; that is the great advantage.

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Thursday, 26th April 1877.

MEMBERS PRESENT:

Mr. Clifton.	Sir Andrew Lusk.
Mr. Forsyth.	Mr. M'Lagan.
Mr. Hardcastle.	Mr. Onslow.
Mr. John Stewart Hardy.	Sir Henry Peek.
Mr. Hayter.	Mr. Ritchie.
Sir James M'Garel-Hogg.	Sir Henry Selwin Ibbetson.
Mr. Kinnaird.	

SIR HENRY SELWIN IBBETSON, BART., IN THE CHAIR.

Mr. *Thomas Mitchell*, called in; and Examined.

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3144. *Chairman.*] I BELIEVE that for many years you were connected with the Exeter Hall Concerts?—I have been so for many years.

3145. And being so connected, you are able to tell the Committee from experience what the conditions of that building are with respect to the protection of the public against fire?—I am.

3146. You were, I think, for many years one of the directors and one of the committee of management of the Sacred Harmonic Society?—For many years.

3147. Speaking for the interest of the preservation of life in case of alarms by fire, do you think that the existing means of escape in case such an alarm arose are sufficient in Exeter Hall?—I think there is no building in London where a large audience assembles which is so badly constructed as regards exit or entrance in case of an alarm of fire, or any other panic.

3148. We had it stated I think the other day in Committee by the architect to the company which at present hold Exeter Hall, that there were two principal entrances, one leading from the Strand by a long corridor, and three staircases up to the concert-room, and another which led out into Exeter-street, with a small doorway out of a 10-foot passage. Those I believe are the only present means of exit?—Those are the only present means of exit. There were many answers given to honourable Members of the Committee by the witness which I am sorry to say I cannot agree with, from my long experience of over 40 years, during which time I have been a member of the Sacred Harmonic Society, and taken a very active part in seating the audience, as occasionally honorary superintendent of the stewards.

3149. Perhaps before we go into that matter I ought to ask you are you any longer connected with Exeter Hall?—I am.

3150. You at present hold an office in the House of Commons?—I do. I am also connected honorarily with the Royal Albert Hall, upon which I should like to make a few observations.

3151. Will you tell the Committee what office it is you hold in the House of Commons?—I have charge of the documents in the Committee Office, under the principal Clerk, and I am also an officer under the Serjeant-at-Arms occasionally.

3152. You do not speak from any practically engineering experience with regard to construction, but simply from a knowledge acquired during 40 years of seating people in this concert-hall, and the means which have been and are still available for exit from that Hall?—I cannot speak professionally as regards

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the construction of the Hall, but merely as regards the seating of the audience attending those concerts for so many years, and having always felt the slender means of exit in case of fire, or an alarm.

3153. Have you, as one of the directors on the Committee there, ever represented your anxiety and fears on this point to the other members?—When I was serving as one of the directors of the concerts, I mentioned the slender means of exit; I suggested that there should be a door or an exit made from the chamber itself, into the northern end of Exeter-street. I beg to produce a plan of the Hall, and to show where I propose that the doorway should be made. (*The Witness explained his Plan to the Committee.*)

3154. I understand that this plan shows what was put before the Committee the other day, that there is one principal entrance from the Strand to the chamber where the audience are, and that there are four entrances, two for the orchestra, and two for the reserved seats, which deliver into the ground plan of the building; there are two other exits by staircases leading from the gallery on the western side of the audience chamber, which by circuitous passages and staircases deliver the audience from the west door, which opens upon Exeter-street?—Precisely.

3155. Your suggestion that an additional door should give facilities for the audience to go out is, that it should be a door, not in the west front in Exeter-street, but in the north part of Exeter-street, where Exeter-street turns to the north, and that it should be a door leading by a staircase from the chamber on the north side of the audience part?—Yes, that was my suggestion. I think that an entrance from the Hall, delivering into the western part of Exeter-street, would be impracticable; but the entrance you allude to from the chamber itself, which is more than 20 feet above the basement of the building, would deliver an audience direct into Exeter-street.

3156. I suppose you represented that to your committee on account of your feeling that those existing passages, of which there are four for the reserved seats, and two for the gallery, and the western exit are so narrow, as to be practically useless on account of the block of the audience, in case of any panic or alarm?—That was a reason, and also I proposed that it should be made available for the members of the Society and their friends; there were two reasons I gave for making a doorway from the Hall into Exeter-street.

3157. But do you think, looking at those existing modes of exit, that in case a panic occurred the present passages, with the exception probably of the one leading into the Strand, would be really available?—No, I do not.

3518. They would, from their narrowness, be blocked almost instantly?—They would be blocked almost in two minutes. If the Committee will allow me, I will give them an instance of the danger I apprehended some years ago, when a fire took place at Savoy-street, during the performance of one of our concerts.

3159. Savoy-street is very close to Exeter-street, is it not?—Savoy-street is within 80 yards of the Hall itself. The fire occurred at a large printing establishment owned by a man of the name of King. My recollection is very vivid with regard to that; the establishment was burnt to the ground; the fire took place at 9 o'clock in the evening, when we had an audience assembled in the Hall as great as we usually have; there were, I think, upwards of 2,000 audience, and more than 700 in the orchestra. I trembled for the safety of the people on that night.

3160. Did you take any steps then to prevent this alarm of fire reaching the knowledge of the audience?—I did, with the other members of the committee. We gave orders that no person should be allowed to enter the Hall under any circumstances, and allowed people to go out, which fortunately they carried into effect. The concert was over at a quarter past 10, and by that means we kept the audience in a state of ignorance with regard to a fire so contiguous to the building. They knew nothing of it until they came out, but the whole of that time I was in the greatest state of alarm for the fate of the audience in that cramped, confined building.

3161. What is the average number of concerts that there are at night as compared with those that are given in the day. Are they frequently held at night?—Our concerts are always held at night; the average number we give in the season is from 11 to 13, and they are always given at night.

3162. You

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3162. You stated that this was an instance in which a fire happened some 80 yards off, but Savoy-street is by no means the nearest point of danger to the Hall itself. I suppose a fire occurring in Exeter-street would be infinitely more dangerous to the Hall, and would therefore render it more difficult to control the audience, or even to allow them to remain there until it was got under?—The northern side of Exeter-street is extremely narrow; it is narrower than half the width of the Strand, so that honourable Members can imagine the close proximity of buildings liable to fire among which the Hall is situated; there is a large printing establishment there, and if a fire were to take place all the windows look over that portion of the Hall, but there are no windows facing the Strand, which I think was one of the means of the audience being so ignorant of the fire in Savoy-street, but on the northern side of the Hall there are windows, and if a fire took place in one of these establishments nothing could prevent the people seeing the reflection, hence a panic.

3163. A panic would arise at once on the people seeing the reflection of the fire?—Yes, the space between those factories and the places of business and the Hall is extremely narrow. About six or seven years since, I daresay, honourable Members may remember a fire took place immediately in the Strand, at Rimmel's manufactory, at the corner of Oakley-street, which took place at night, but fortunately not during one of our concerts, or we should have had great difficulty in preventing our audience being acquainted with it. I mention that to show that something should be done to give a further means of exit.

3164. All you wish to place before the Committee is that having this number of years' experience of the danger the public are in from a panic or an alarm of fire there, something should be done to increase the safety of the public in such a building?—Yes.

3165. I understood you in one of your first answers to say that you held also an honorary appointment at the Albert Hall Concerts?—Yes.

3166. Has the question of safety with regard to the Albert Hall been better considered than it has with regard to Exeter Hall?—From long experience in large audiences, having devoted nearly the whole of my spare time in an honorary capacity to music, and whenever music is brought forward having taken a great interest in it, I was consequently asked to take honorary duty at the Royal Albert Hall. To compare the Royal Albert Hall and its means of exit with Exeter Hall, large audiences being assembled in both places, is impossible. I think the Albert Hall is the most admirably constructed place in the world. My duties are honorary, therefore I have no interest in giving anything but an unbiassed opinion.

3167. That being a circular building, the exits are very numerous, are they not?—I will state the number of exits and the number of people the Albert Hall will contain, if the Committee will allow me.

3168. Will you first state the number of people which the Albert Hall holds?—There were last Good Friday at one of our performances of the "Messiah" between 8,000 and 9,000 people assembled in the Hall, exclusive of the orchestra; there were 4,551 tickets issued for the gallery alone; there are seven gangways leading out of the amphitheatre.

3169. How many exits are there from the gallery for the audience of which you have given the number?—There are four staircases communicating from the gallery, and from the main building into the street there are 22 exits, and each of those exits is more than five feet wide.

3170. And those exits all lead by direct passages from different parts of the auditorium?—Yes. As an illustration, I beg to mention to the Committee that in addition to the seven gangways from the amphitheatre, there are means of access to the amphitheatre from the arena as well as the corridors in the arena below; those gangways are about 4 feet 6 inches wide; each doorway leading from the gangways to the amphitheatre is at least 7 feet wide.

3171. They all increase outwards in width?—Yes.

3172. That is, of course, the advantage of having a circular form that you get the greatest width outside?—Yes; then there are corridors with swing doors to be thrown open, and 22 exits into the main street.

3173. So that, practically, there, from its construction, a block is not nearly so likely to occur as under the circumstances you have mentioned at Exeter Hall?—I have felt the greatest alarm at our concerts at Exeter Hall, but I have always

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always felt the greatest security at the Royal Albert Hall. On the roof of the building over the picture gallery there are 15 tanks, each containing 1,400 gallons of water.

3174. Is the method which you have suggested the only one which could be adopted at Exeter Hall for giving increased security?—The two narrow doors going under the orchestra from the large hall at Exeter Hall should be done away with in some way, or widened; there is plenty of room to widen those doorways.

3175. What is the width of the passages beyond the doorways?—The doorways open to a width of about 10 feet.

3176. Then, practically, if the doorways were done away with, or made of the same width as the passage, that block would not arise that you are afraid of?—It would afford a greater means of exit certainly.

3177. Were your suggestions ever more than considered; was any attempt ever made to deal with this difficulty?—I think not. Our late president, Mr. Harrison, was a director of the society and a shareholder; and my late friend Mr. Bowley and other directors were also shareholders; the expense might have operated on their minds; it was never stated that that was the reason, but it has never been gone into.

3178. There has been no effort made to add to the present means of exit?—I am not aware of any means that have been taken to make that exit that I have represented.

3179. I wished to ask you if you thought the water appliances for extinguishing fire which exist at Exeter Hall are satisfactory?—I have always understood that they have nothing more than buckets there.

3180. As we were told the other day, they are dependent upon a tank or reservoir, or whatever they call it in the building, with a row of buckets, for the extinction of any fire which may occur?—I have asked what means there were for extinguishing fire, and those are the means which I have been told by the hall-keeper that they have.

3181. Were you aware, from your own knowledge, that the hall-keeper was the person entrusted with the means of extinguishing fire, in case of need?—He is the person I should go to in case of accident. He has the keys of every door in the building.

3182. Supposing a fire occurred, and there was excitement among the audience in the building and difficulties arose, would the porter in charge of the keys be able to get to the appliances through the crowd?—I should very much doubt it, but there would be such a rush down that staircase that it would be impossible.

3183. Therefore, practically, the appliances being left in the charge of a man in his position would be almost useless?—It is very injudicious indeed.

3184. Is there anything which you wish to call the attention of the Committee to in the evidence of the last witness?—I am very unwilling to contradict a witness who has been examined before a Committee of this House, but I should mention one fact. If I remember rightly the witness stated the number of steps leading from the Strand main entrance to the Hall itself (which is a very important fact) as 34. Now, as a matter of fact, there are 50 steps, which I have always considered a most dangerous thing in the way of exit.

3185. That is the Strand staircase?—The staircase leading from the Strand.

3186. The width of that staircase I think he stated was about 5 feet 6 inches or 6 feet?—I think it is more than that. I think the main staircase is more. It ascends from the Strand by two small staircases of 13 or 14 steps, and then a narrow landing merging into one main staircase into the Hall. I apprehend that those small staircases or steps would be about 5 feet 6 inches wide.

3187. There you have evidently in that staircase the very construction which is objected to, that is, a wider one diminishing into a narrower staircase, and therefore the probability of a block as soon as you get to the narrower part of the staircase?—Precisely. Then in answer to an honourable Member, I think at Question 2992, when he was asked, "Do all your doors open outwards or inwards?" he replied, "They open both ways." I think the witness intended to allude

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allude to the swinging doors when he said they opened both ways. Inside the main entrance there are two swinging doors to which I think the witness alluded, but the main doors open inwards upon those swing doors.

3188. What I would ask upon that is this: the main doors are the doors on to the street, are they not?—Yes.

3189. Are those doors, when any concert is going on, kept permanently fastened open?—Yes, they are.

3190. Therefore that difficulty does not really arise, and the first obstruction is practically a swinging door which does go both ways?—That is so.

3191. Are those all the points which you wish to call attention to?—I think there is nothing more; an entrance from the northern part of the Hall would be the principal object I have in view.

3192. What you would place before the Committe is that it would diminish the pressure before those existing entrances, if as has been suggested by you to the committee of the Hall an additional staircase and this additional door were made?—Yes; which would of course obviate the necessity of making an entrance from a portion of the building which an honourable Member suggested, namely, in the basement, through the porter's room.

3193. Is that entrance made through the porter's room the same as Mr. Maberley stated to the Committee was occasionally used, namely, a window turned into a mode of exit?—No; that is upon the side of Exeter-street.

3194. With regard to that, do you think that it would give greater facilities for the people getting away from the Hall, if a practical door were made instead of that window?—That window is converted into a door when concerts are on.

3195. Is that always used as an exit?—It is always used as an exit when the concerts are over.

3196. It is always available at present?—Yes, it is close to the present main entrance.

3197. Mr. *Onslow.*] Have you any practical knowledge of any other music hall in London besides Exeter Hall and Albert Hall?—I have been at all the musical festivals throughout England and most parts of Wales.

3198. Have you ever had a musical festival or concert at the Egyptian Hall, in Piccadilly?—No, I have not.

3199. The Committee have had it in evidence from the architect of Exeter Hall, that the construction of the Hall itself is very good, *quoad* fire; is that your opinion?—I think the construction is very sound and very substantial, but there are offices under the Hall itself let out to various societies.

3200. We have heard that there is a wine and spirit merchant who has his offices there?—The wine merchant's offices are cellars principally; I think they have an office above their cellars, but under the main body of the Hall there are a number of offices let out to various societies.

3201. What do you mean by societies?—I cannot remember the names of all the societies; the Strangers' Friend Society is one, and that I think gives an additional chance of a fire occurring.

3202. May I ask you to whom you mentioned your fear regarding fire?—I mentioned it to the Committee of Directors, of whom I formed one; it arose partly from the desire for another entrance to be used by members of the society and their friends, apart from the general public.

3203. Have the committee done nothing at all to meet your views?—There has been nothing done in that way.

3204. Has nothing been done because the committee thought the building safe?—I should be sorry to say they thought it safe; nobody could think it safe.

3205. Want of funds then, perhaps, was the cause?—Probably the expense that would be occasioned was considered; some of the directors were shareholders, and it is possible that they considered expense as one reason.

3206. Have you ever considered the cost of the suggestions which you placed before the committee if they were carried out?—I have not, but the expense would be proportionately very small; merely a staircase cut through the wall similar to the Strand entrance. Of course you would be obliged to have the same descent and the same number of steps.

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3207. How long do you think it would take to carry out your suggestions?—I think they might be carried out within a month certainly, but I do not speak from personal knowledge.

3208. I think you stated that you thought it was impracticable that the western entrance should be widened?—I think a staircase from the chamber of the Hall to the western entrance would be impracticable; the gallery stands in its way. Will you allow me to correct an answer which I gave you with regard to that. Upon consideration I think the staircase, which is a very small and narrow one at the western entrance, might be made much wider.

3209. And with regard to the western exit?—That is the western exit leading into Exeter-street.

3210. You think that might be widened?—The staircase might be widened. The door, I think, leading into the street is the same width as the door leading into the Strand, but the staircase might be improved considerably.

3211. Would there be any advantage in having that door widened?—I do not think it would be an advantage, because as the honourable Chairman mentioned, the window close to that doorway was converted into another exit after the concerts were over, leading into the same street.

3212. To sum up your evidence, may I take it that in cases of alarm from fire, or any other cause, the consequences to the public would be most disastrous?—I have always felt it, and I have never been able to divest myself of the idea of the vast amount of sacrifice of life which there would be, particularly after the fire occurring on the night I mentioned.

3213. And that alarm from fire or other cause need not necessarily take place from something inside the building; it might take place from something outside the building, the glare, and so on?—Yes; a panic might arise from seeing a glare, particularly on the northern side, where the windows are. I attribute the safety of the audience on the night of the fire in Savoy-street partly to there being no window on the southern side where they could see any reflection.

3214. Sir *Henry Peek.*] Would there be any structural difficulty in making a wide exit into the north side of Exeter-street?—I apprehend there would be none, because immediately they cut through the wall of the Hall they would come over the area. There would be nothing to obstruct a staircase being made there into Exeter-street.

3215. How long does it take entirely to clear the Hall, after one of those evening concerts fairly attended?—About 10 minutes; from 10 to 13 minutes.

3216. You stated that there were very few materials to burn in Exeter Hall; is it built on brick arches?—I believe it is; it seems very substantial. I think I asked a question once about the floor of the Hall, and what protection there was, and the hall-keeper told me that there were brick arches under the chamber.

3217. You would quite agree then with Mr. Maberley that there is scarcely anything to burn in the Hall itself?—There is not, with the exception of the seats and such things. Of course, in those offices which are let out, there would be inflammable material.

3218. If I understand you aright, all the suggestions you have made have been made in vain?—Yes; nothing has been carried out. I did not particularly press the matter after mentioning it, because I felt that there were some of the shareholders in it.

3219. Perhaps it is not a very good paying concern in the way of dividend; do you know anything about that?—I believe now it is a very badly paying concern; the dividend is very small. I think the principal revenue is derived from our own concerts; and I was told a short time since that if we were to give over or dissolve the Sacred Harmonic Society, they would be almost obliged to shut up the Hall. That was an observation made to me by a gentleman connected with the proprietary.

3220. Sir *Andrew Lusk.*] Are you one of the proprietors of this Hall?—No.

3221. Do you know whether this subject of the danger which you refer to has ever

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ever been brought before the proprietors?—Not being a shareholder, I am not aware that it has been brought before the proprietors.

3222. As one of the managers of the Sacred Harmonic Society, did you ever bring the matter before the proprietors?—I was never informed that such had been represented to the proprietors of the Hall by any of the shareholders, or my friends on the directorate.

3223. Do you think that this is a dangerous structure for the public to be gathered into, considering the exits from it?—I think it is one of the most dangerous places for the public to be gathered into in London, or anywhere, that I have seen.

3224. You think it is a dangerous place for the public in case of panic from any cause?—That is my principal fear.

3225. Suppose at one of the May meetings a panic occurred, there would be equally danger then?—The danger would be equal in a crowded audience as well by day as by night.

3226. Do you think that a place like this should be put under some public authority for structural purposes?—I always considered that Exeter Hall should be under the control of some body. I was given to understand that the Lord Chamberlain had no control over the concerts as he has over theatres and places of that sort.

3227. You consider that all places of this sort should be placed under some public authority with regard to the safety of the lives of the people who go there?—Decidedly.

3228. What public authority do you think, from your experience, would be the best?—In another honorary capacity, which I have fulfilled for many years in the parish of Lambeth as late churchwarden of that great parish, and member of the vestry, I have had a considerable amount of intercourse with the Metropolitan Board of Works, and I have always found that to be a most excellent body for such purposes, or anything connected with the metropolis. I should rather like to see the Metropolitan Board of Works have some authority there.

3229. You think it would be better that there should be some architectural authority who should take charge of all buildings of this kind all over London?—Certainly, as regards the structure.

3230. Even churches are supposed to require to be looked to sometimes?—My answer would apply to all gatherings of people.

3231. Mr. *Hayter.*] Have you ever known of a panic occurring in Exeter Hall?—Only the one which I mentioned to the Committee, of the fire in Savoy-street; that was very close upon a panic, prevented only by management.

3232. Mr. *Forsyth.*] I believe the Albert Hall was not designed by a professional architect?—I am not aware; it was constructed some time before we held our concerts there.

3233. There is an immense advantage in having a circular or elliptical building as regards the means of exit as compared with a long oblong building like Exeter Hall, surrounded by buildings on all sides?—Yes, I think I have exemplified that in the construction of the Royal Albert Hall.

3234. That is very much upon the plan of the Colisseum at Rome with the vomitoria widening towards the outside?—Quite so.

3235. I was at Exeter Hall the other night at a very large meeting; you have spoken of the two sorts of tunnel means of exit, only allowing one person at a time to pass from the orchestra, but even when they have got out of those tunnels, they have to go down tortuous stone staircases; would there not be the greatest danger of people falling down, and of loss of life from the pressure?—Decidedly, and I may add to that, that the people enter into a passage of about 10 or 12 feet wide, but then they converge into a very narrow passage of about five feet before they come down to the staircase.

3236. Like the narrow neck of a bottle?—Just so; nothing could be worse.

3237. *Chairman.*] What I imagine you to represent to the Committee is, not that Exeter Hall is a dangerous building in itself, but that from its present means of exit it is dangerous to the audience in case of panic; you do not look

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at it as dangerous from being more exposed to fire arising within itself than any other building, but merely that if a fire, or an alarm of fire arose, the audience have less facilities than in other buildings for getting away?—Quite so; the only object I have in view is to convey to the Committee the position of the audience in case of panic, owing to the construction of the building.

Mr. *James Muir*, called in; and Examined.

Mr. J. Muir.

3238. *Chairman.*] I BELIEVE you are Engineer of the New River Company?—I am.

3239. Can you describe to the Committee shortly what the duties of the London Water Companies, with regard to the supply of water for extinguishing fires in London, are?—The London Water Companies are under an obligation to deliver water, and without charge, for putting out fires, and they are also under an obligation to maintain certain pressures, which their own Acts define.

3240. Those pressures, I think, were laid down by their Acts?—Yes, those pressures were laid down by their Acts, and they have been very accurately described by a former witness, Mr. Bramwell.

3241. Mr. Bramwell, I think, stated that the New River Water Company, by the 28th section of its Act, was obliged to deliver not more than 70 feet above the pavement?—They are obliged to deliver to the top storey of every house not exceeding 70 feet above the ground, and not exceeding 300 feet above Trinity high-water mark.

3242. Would you describe to the Committee how the New River Company have carried out those obligations?—They have, with very few exceptions, provided that pressure, and they have for some time been engaged in works to increase the pressure above the specified amount.

3243. I suppose that would be in order to meet the required domestic supply?—It arises in this way: there are certain districts in which the houses hitherto have been of a low description, and not of any great height, and there the water has not been needed to the limit of 70 feet, but as houses are increasing in height every day, some time ago the directors undertook works for the purpose of increasing in those districts the pressure to meet the wants of those higher houses.

3244. Will you tell the Committee what provisions are now made by the company for the pressure which is in general use?—There are several reservoirs at the present moment in use for the supply of the New River district; the lowest is in Claremont-square, Pentonville; it is shown upon the map (*the spot being indicated*), and that reservoir is at a height of 126½ feet above Trinity high-water mark. The next reservoir at present in use is at Maiden-lane, Highgate, and it is shown upon the yellow ground as a blue patch; that reservoir is at an elevation of 219½ feet above Trinity high-water mark; the next reservoir shown in dark yellow is at Hornsey-lane, and that has a height of 335 feet, nearly 336 feet above Trinity high-water mark; the next reservoir is at Highgate, having a height of 420 feet above Trinity high-water mark. The highest reservoir is at Hampstead, having a height of 433½ feet above Trinity high-water mark, and outside the metropolitan area the company have another reservoir recently constructed having a height of 295½ feet above Trinity high-water mark.

3245. Can you describe to the Committee how that pressure affects the different parts of the district which you supply?—The district supplied by the reservoir in Claremont-square, which I first named, has an elevation varying from something like 2 feet above Trinity high-water mark to a height of 61 feet above Trinity high-water mark. That is the level of the district to be soon supplied by this reservoir. I should here mention that the map before the Committee represents in red a new district, a district having now water partly from the Maiden-lane reservoir and partly from the Claremont-square reservoir; but that district in future is to be supplied by the reservoir in course of construction shown at that point (*pointing to the map*). The Claremont-square reservoir will supply the lower parts of the city, and that valley which extends from the lower part of the

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the city through what was formerly the course of the Fleet river; that being low ground it is served easily from the reservoir in Claremont-square.

3246. That as I understand is a district which has an elevation above high-water mark of from 2 to 61 feet?—Yes. (*A copy of the plan was handed in.*)

3247. Now will you describe the next district?—The next district being arranged for is the one shown in red; the whole of that large district will have its supply from the reservoir on Crouch Hill, which is shown by dark red on the plan.

3248. What are the varying levels of the red district?—The levels of the red district vary from 5 feet to 107 feet above Trinity high-water mark.

3249 What is the height of the reservoir?—The height of the reservoir is 183 feet above Trinity high-water mark.

3250. And the third district?—The third district, which is represented by the blue colour, is served from the reservoir in Maiden-lane, Highgate, which reservoir is on the map indicated by the dark blue patch; the levels of that district vary from 8 feet to 147 feet above Trinity high-water mark; the height of the reservoir being, as I have stated, 219½ feet above Trinity high-water mark.

3251. Are all parts of this district within the metropolitan area?—A portion of the red and also a portion of the blue district extend beyond the metropolitan area.

3252. But there are portions which are served by each of these reservoirs which are within the metropolitan area, with which we are dealing?—The dark dotted line along the map shows the limit of the Metropolitan Board of Works' jurisdiction.

3253. What we ought to confine ourselves to is to all these services which are practically working and of use for the metropolitan district?—I have not gone entirely beyond the metropolitan district, though some of the districts named do stretch beyond the boundary.

3254. But at the same time those services are supplying parts of the metropolitan area?—Yes. The fourth district in an ascending order has its supply from a reservoir in Hornsey-lane; that district is indicated by the yellow colour, and a large portion of that district is within the boundary of the Metropolitan Board of Works; the heights of the fourth district vary from 120 feet to 268 feet above Trinity high-water mark; the reservoir of the district having, as I have already said, a height of 336 feet above Trinity high-water mark.

3255. There is still one more, I think, is there not?—Then there is one more district having two reservoirs, but these are so nearly of the same level that I call the district one. One reservoir is at Highgate and one at Hampstead.

3256. Do both of those reservoirs serve the metropolitan portion?—Both those reservoirs serve portions of the metropolitan district, but the larger portion of that district would be outside the metropolitan boundary, and I should mention that that district is nearly all above the 300 feet limit of the company's supply mentioned in the section of that Act to which you have referred.

3257. That, I suppose, arises from the fact that the levels of that district are so high?—Yes.

3258. Have you given the levels of that district?—I have not given the levels of that last district; being beyond the limit I have not taken note of them.

3259. Not even of those portions of it which are supplied within the area?—I have not.

3260. Can you compare at all the pressures which your company give in this way with the similar pressures which have been put before this Committee as being applied to other towns?—The pressure of the New River district has been given here by former witnesses. I think that the gaugings made by Sir Joseph Bazalgette are not in every case to be depended on. On this account, not that he is inaccurate in his observations, but I know as a fact that some of the gaugings were taken from mains carrying unfiltered water, and not connected with a high-pressure reservoir, and in one or two cases he has therefore given a pressure apparently very low, which pressure is accounted for by the fact I am mentioning, that the connection where the pressure was taken was with a low service main carrying unfiltered water.

3261. Can you state what proportion of your district is under the constant as compared with the intermittent supply?—The lines upon that map show all the lines of constantly charged mains.

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3262. And were the experiments and observations made by Sir Joseph Bazalgette taken on the mains only, or on mains and service pipes indiscriminately?—I should think from mains only. He had no communication with us on taking those pressure gaugings.

3263. But the tests which he applied showed what really were the reliable pressures he might depend upon in case of fire?—Entirely so, because in every case, I believe, in the New River Company's district, the gaugings were taken during the day at times when the maximum draught of water was taking place for ordinary purposes.

3264. What you meant in representing to the Committee that many of them did not really tell their true history was, that your mains furnished with this unfiltered water are more for private supply, and are not fitted at the same pressure as your ordinary mains?—Those mains carrying unfiltered water are entirely for street and sewer flushing purposes, and, in some cases, for road watering. There is no supply delivered by the New River Company or any of the other companies for domestic purposes which is not filtered.

3265. What we are inquiring into is the question of the supply of water as a means of extinguishing fire, and Sir Joseph Bazalgette represented pressures from his experiments varying, you say, in some points from what you would wish the Committee to understand with regard to them?—In two or three cases in the New River Company's district I know the pressures have been very much understated from their having been taken from these low-pressure unfiltered water mains which are devoted to street purposes.

3266. But would the mains which are devoted to these street purposes be the mains to which the fire engines would go; would they be the mains used for fire purposes?—No, the plugs used for fire purposes are on the high-pressure mains which carry filtered water.

3267. Therefore to that extent as the inquiry is only dealing with fire, the pressure was misstated to the Committee?—To that extent. I only say in two or three cases.

3268. In which, from there not being mains used for this particular purpose, but only for street watering purposes, the test of pressure was not quite accurate?—Quite so.

3269. Can you inform the Committee what the general pressure is in the mains, which you say are marked upon that map, which are available for fire purposes?—The Committee have already had accurately stated by the engineer of the City the pressures within the City area; the pressures outside the City area are, in most places, quite as good, if not better, than within the City. The City pressure has been sometimes spoken of in this Committee as exceptionally good; that is not so.

3270. That applies to portions, but do you mean that generally throughout the district that pressure would be available, which has been stated to be available within the City generally for fire purposes?—Quite so.

3271. Such as they are proposing to utilize in the City?—Yes.

3272. And that exists you state generally through the districts supplied with mains as marked upon that map?—Yes; and I should here point out, as you have heard, that good as that pressure is now, by the works in progress it will in many places be made very much better; most of the City pressure will have 50 feet added to it very shortly.

3273. Is that in consequence of the new reservoirs?—In consequence of the construction of the reservoirs, shown red upon the map.

3274. Will that additional pressure be given in the City only, or throughout the district?—Throughout the district, coloured red.

3275. That touches a portion of the City, but not the whole of it?—Not the whole of it.

3276. Is there any means of making the greatest pressure available for your whole district by uniting your supply?—There are communications now, and those communications might be opened so as to let the extreme pressure into the lowest ground, but it would be very unsafe to do so. We have never yet found any case in which there has been a want of pressure requiring such letting down of water from a high district into a lower one.

3277. I quite understand that, because I imagine you mean that the letting down of this water and bringing a greater pressure is dangerous on account of the system of pipes?—Very dangerous.

3278. But

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3278. But you have facilities; supposing that your pipes were sufficiently strong for the district to bear it, for bringing to bear the greatest pressure you possess in any part of your district?—I do not feel any fear as to the strength of the company's iron pipes, but I know that in a great part of their district, especially in the City, the lead pipes in the houses and belonging to the houses would not bear the pressure of the higher reservoirs.

3279. Then supposing the existing system to continue, and the supply for the purposes of protection against fire to be one with the domestic supply, it would not be possible to utilise the highest pressure which you have in many parts of your district?—It would not be possible, because of the breakages which would probably take place in house pipes.

3280. And therefore the present system, for that reason, so long as the two purposes remain united, would have to be maintained?—I think so.

3281. Can you tell the Committee if you are aware what comparison this pressure which you give in your district bears to the pressure which is given in other large towns?—I think that excepting such cases as Manchester, and portions of Liverpool, where the natural advantages are such that they can command a much greater pressure, the pressure throughout London compares very favourably with that of other large towns.

3282. Brighton is one case about which we have had some evidence before this Committee?—I do not think that upon the average the pressure of Brighton is better than the pressure of London.

3283. It was put before this Committee that at Brighton the highest pressure they possessed could be used for their fire purposes, and that was a pressure, I think, greater than what you have stated to exist, even from your highest reservoir?—If I were to say in the same way that the pressure of our highest reservoir might be let down into our lowest ground, I would in effect say that the addition we could make to our pressure would be even more than the addition which could be made to the pressure at Brighton by a similar process.

3284. But still their existing system at Brighton is to that extent before the existing system in London, because they can avail themselves of their highest pressure for the purposes of fire, whilst you have stated to the Committee that it would not be safe, in your opinion, to utilise the greatest pressure you can apply?—I do not think it is a very safe thing in any town to allow the pressure of a high reservoir to descend into a district usually served from a lower reservoir.

3285. Are there any other reasons beyond those of the breakage of pipes and the want of strength in the pipes, which induce you to say so?—There is one other reason, that if the reservoir serving the higher ground is not a very capacious reservoir, and if it is thrown into the lower district, it has to supply not only its own district but the whole of the lower district, and provision would have to be made not only for the reservoir being of ample capacity for both districts, but that the feeding main supplying the top reservoir, and the power at the end of that feeding main should be adequate to put into the top reservoir all that was needed for the lower district as well as its own.

3286. I conclude that the application of this pressure which would be required would be a temporary one only?—It would be a temporary one.

3287. Therefore it is not like permanently using the pressure and exhausting the supply as against the parts of the district served by that supply, but it is for a temporary occasion. You are able to utilise the pressure perhaps for an hour or so, and therefore you do not get into the difficulty you have suggested surely?—It would always be a temporary thing; most of the fires will only last for an hour or two, but if there were a great fire it might be for very many hours.

3288. What I meant was, that your objection seems to go to the fact that the upper district would lose its supply altogether, whilst the water was run into the lower area?—Where there is great inequality of level, there is no doubt that the water let down from the top district would pass away into the lower district, and leave the top district for the time very badly supplied.

3289. For the time that the pressure was required in the other district?—For the time that pressure was required in the lower district.

3290. What are the arrangements made by the New River Company with regard to the service of their mains?—All the mains are constantly charged; they are shown in lines upon the map, and from those mains branch smaller

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pipes, and those pipes are as a rule opened daily for the supply of the tenements connected with them, and upon those service-pipes are plugs from which water is drawn in case of fire. I have on the table one of the plugs in order to explain the nature of the thing; there is a portion of a pipe with a plug in it (*exhibiting a model to the Committee*). There are two plugs; one is the large one commonly in use, the other is a plug which for a time we tried where our pressure was rather high, and where we could not get the larger plug to remain in its place. The smaller plug was adopted there, but it was so very troublesome that we have given up using it altogether.

3291. Do I understand you from that to say that your difficulty was what has been stated to the Committee as a result of using plugs with any amount of pressure, namely, that they are forced out?—They are forced out.

3292. With the existing pressure which you have in your mains throughout the town do you find that to be the result?—The plugs on the mains with the existing pressure are very unsafe. We have very few plugs indeed on a main except when the pressure is lower than the average.

3293. With regard to what you have just said, it has been stated to this Committee early in the inquiry that plugs cannot be used on mains constantly charged where there was even such an amount of pressure as is generally supplied in London; but I see Mr. Bramwell was asked at Question 5830 with regard to this point, and he stated that in Liverpool, where there was a constant supply from a reservoir 218 feet above Ordnance datum, the whole of Liverpool being under constant supply, there were 208 fire-plugs on leading mains, and 2,978 fire-plugs on distributing mains; and then, at Question 5831, he was asked: "Whatever number there are it proves that the pressure does not prevent their use"? and he says, "Quite so"; do you agree with that?—I cannot question a fact, but I know that, as a fact, that in our district the main plugs cannot be kept in their place. Upon an occasion of frost they jump up and do a great deal of damage, and on the occasion of fire they are quite uncontrollable. With regard to the Liverpool plugs I do not know their size, and I do not know their construction; perhaps they are after our expedient of having the aperture very small to diminish the area of the pressure, and perhaps they are only on high ground where the pressure is not very great.

3294. It seems to be a pressure of 218 feet above Ordnance datum?—The reservoir commanding Liverpool is at that height above Ordnance datum, but the plug may be 100 feet or 200 feet above Ordnance datum also.

3295. What you would represent is, that though that is the pressure they can bring to bear, yet there are many parts of the district at a level where it does not represent that force?—That answer tells you nothing of the pressure on the plug, nor of the size of the plug exposed to pressure.

3296. Mr. Bramwell is then asked: "Are those the ordinary fire-plugs such as are used in London?"; to which he replied, "I am told that some of them are iron plugs, and not the ordinary wooden plugs. It was a novelty to me, but nevertheless they are of a similar construction to our own plugs; that is to say, like a cork put into a bottle not screwed down." Then he is asked: "And notwithstanding that, and that they have a much higher constant pressure, they are useful, and are not blown out." He then quoted a letter: "He copies the telegram. The telegram was: 'Fire-plugs on leading mains, 208 usually, in sets of three; fire-plugs on distributing mains, 2,978, chiefly for washing streets;'" but you state from your own practical experiments that with regard to the district of the New River Company, where their mains are charged as they are at present with the existing pressure, you have found a difficulty in using fire-plugs?—We have, and they are not used practically on the occurrence of a fire, because even where a plug may be quite sufficiently firm in its place to remain under the pressure, it is a thing which cannot properly be controlled as an instrument for drawing water from in case of fire; there is risk in getting it out, and very often when it is got out the rush of water from it tears up the street and throws over the box altogether which covers it, so that the firemen cannot use properly the main plug which has disturbed the ground in that manner.

3297. I suppose that, beyond there being a satisfactory means of getting a supply of water in case of fire for the engines, they are a cause of great waste of water to the companies?—The main plugs are never used in case of fire, with very rare exceptions, so that they have not occasioned any waste. I have pointed

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pointed out the difficulty of having those main plugs, and that they are not used, in order to show that all plugs which have to do with the supply in case of fire may be said to be upon the services.

3298. At present the mains which supply your district are not supplied with plugs?—There are hardly any plugs upon them except where the pressure is light.

3299. Have you considered the question of the application of hydrants as a means of getting at the water instead of plugs?—I have.

3300. Do you think there are advantages in hydrants for that purpose?—There are great advantages; it has been said that one instrument can be used as readily as the other; it is not so. Say that the plug is found on the occurrence of a fire, the great difficulty is to discover where the cock is which commands that plug; a fireman can easily by proper care in a street pull a plug out, but he finds no water there unless the service happens for the time to have its supply on; he does not know the position of the cock (maybe 150 yards off) which will give him water for the plug he has drawn, whereas with a hydrant you have at the very spot where you want the water a place for turning it on with a key; there is the great advantage of the hydrant.

3301. An additional advantage also would be that your hydrant would be placed upon your mains generally throughout your district?—That is another great advantage, that whereas now you can only draw out water from the smaller pipes, if you had hydrants you could draw water from the largest pipes in the district.

3302. With a system of hydrants put down over the whole of your system of mains, that which is now the large area of supply, and never used for fire purposes, might be made available?—Quite so.

3303. And that being made available, it would be far more efficient than the existing supply, because those hydrants would be put upon larger pipes?—Quite so. Not only so, but the hydrant itself would allow you to provide for the escape of the water from the main in a more available form. With a plug the plug must be kept of an area small enough to ensure its being retained in its place, and the consequence is that the plug has only a diameter of two inches and never more, and when the plug orifice is used to jet water upon a fire, into it, a stand-pipe (as it is called) is put, and the area for the discharge of water through this stand-pipe is only the area of a circle, having a diameter of an inch and a half. A common size for an hydrant is three inches in diameter, and the difference of area for the delivery of water between the one and-a-half inch stand-pipe and the three-inch hydrant is as one to four, so that with a three-inch hydrant you have four times the area for the discharge of water that you have from an ordinary plug through stand-pipe.

3304. That is, supposing that in the one case you utilise the water through a stand-pipe, and in the other from an hydrant, but the fire-engines usually avail themselves of the water by the plug system from a sort of bath which they use, do they not?—Yes, they do, but in that case the difference between the proportion of the delivery without a stand-pipe put into the plug hole and the proportion from the hydrant is very great. It would be as four to nine, the delivery of the hydrant in that case being more than double the delivery from the open ordinary plug.

3305. Supposing hydrants were placed generally throughout your district, as they propose to place them throughout that part of your district which is comprised in the City, do you think that with the present constant supply which you give, and the pressure which you could give with that constant supply, that would be a very considerable advantage to the public, as compared with your existing protection against fire?—There is no doubt it would, and the committee of the corporation, who have studied the subject for some years, were completely of that opinion. The map which you see upon the right is a map prepared in the year 1873 showing the City area only. That map was prepared to exhibit to the committee of the corporation the number of mains which were constantly charged in the City, and these dots in the lines of the mains represent places where it was thought at one time hydrants ought to be put.

3306. Is that the system which they propose to carry out at present?—It is the system which they propose to carry out. When the committee of the corporation came upon the subject to the directors of the New River Company, this

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this alternative was put to the committee of the corporation by our directors, either to initiate constant supply for the whole of the City, and then all existing pipes in the City would be made ready for hydrants, or if they did not choose to have constant supply generally throughout the City to lay down branches where there were only pipes intermittently charged, those branches having connection with mains, and becoming, therefore, mains, or constantly charged pipes, themselves. Thus throughout the City on a carrying out of these plans, they will have constantly charged pipes in every street without having constant supply in their houses; that was their own election in the matter.

3307. That practically, as long as you have a sufficient pressure, is separating the history of the fire supply from the domestic supply to a great extent?—Yes; and it has this great advantage as far as fire is concerned, that the pressure maintained for fire will be better than if all the pipes communicating with the houses were constantly open and being drawn upon.

3308. That really you will get the highest amount of your pressure in your mains as a general rule?—Yes.

3309. And that it will only be at intervals when the domestic supply is being served, that that will be at all diminished?—That will be so.

3310. Now with regard to the City; I think you stated that the plan which they proposed was to put these hydrants at short intervals from one another?—Under 200 feet.

3311. Is that what was represented upon the plan?—I think those represent something less than 200 feet; they have rather added to the number of hydrants since that plan was made; the distance now, I believe, is about 180 feet.

3312. That being adopted as the plan in the City, and the City engineer and yourself agreeing that if carried out the present pressure which the company supplies will make it serviceable for fire generally throughout the City, do you agree also with the City engineer in saying that the pressure will give you an available jet which will cover the houses in the City, with the exception perhaps of one or two of those newly built warehouses?—I believe it would.

3313. And a jet that you could rely upon throughout the day and night?—You could; you could always have a good jet.

3314. I think you stated that it was a jet of considerable volume with an ordinary length of hose. I presume you agree with what has been stated that as you add to the length of hose so by friction you reduce the jet?—Yes.

3315. But not to such an extent as if the hydrants are placed at such distances as they are there, would render them unserviceable?—The hydrants will still be very serviceable. I admit the friction of the hose is very considerable and will very much interfere with the rapid delivery of water to a fire, but I hold that everything which is said to prove that the friction of the hose is an obstruction is an argument in favour of the retention of fire engines. I think it to be quite an error to speak of hydrants as a substitute for fire engines; it could very easily be proved to be a most expensive thing to do without fire engines if you had for the sake of dispensing with fire engines very much to increase your pressure, and unless you do very much increase your pressure upon your mains it is quite impossible to do without fire engines.

3316. But what you would represent is that, whilst you do not get rid at all of the necessity for having engines, you make those engines far more serviceable by supplying them with the means of getting at the water through hydrants, and that also having those hydrants you create the possibility of using other appliances in addition to, and supplementing your engines?—Quite so. The great advantage of the hydrant is that it gives a more prompt application of water, and there can be no doubt that promptness in the application of water is the main thing required.

3317. You do away with a thing which at present has been undoubtedly spoken to as an evil, namely, the dependence upon the turncock's knowledge of the way in which the pipes are charged?—You do.

3318. Therefore by the plan you propose to adopt in the City, the district being entirely served by hydrants, even with your existing pressure, and your existing supply of water, you could get for the protection of the town far greater security than under the system which is now carried out?—I am sure you would.

3319. That is the case with regard to the City. Are you prepared to say that

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that that could be carried out in the rest of your district?—Of course it could be carried out in the rest of our district quite as easily as in the City, but the laying down of branches as in the City will add very much to the cost of the provision of hydrants. I suppose it would double the cost of providing hydrants. There is no doubt, the cheapest plan of all, in providing constant high pressure for the hydrants, is to have constant supply in all pipes; and as to this constant supply the company are no objectors to it; they would be quite glad to have constant supply under proper regulations immediately, and if hydrants were placed upon their existing pipes constantly charged, you would do the utmost that could be done at a moderate cost to guard against fire; but the most perfect provision for fire would be that suggested some years ago by the late Mr. Easton. There is no doubt of its being the most perfect plan, although most enormously expensive, namely, that of having a separate system of mains, reservoirs, and hydrants for fire purposes only.

3320. Supposing that were done, of course you could by an entirely new system procure a high pressure, which would enable you to do away with the use of engines to a great extent?—To some extent.

3321. But what I wished to ask you was with regard to the present state of things. I understand you to say that outside the City area in the rest of your district, wherever the Committee see these lines in your district with the present mains constantly charged, there a system of hydrants could at once be established equal with the City?—It could.

3322. And that to make that as perfect a system as in the City, it would only necessitate supplementing those mains so constantly charged by branches to fill up the intervals between them which would be equally constantly charged?—Yes,

3323. Still keeping distinct the intermittent service for domestic use from the main service, which would be applicable to both?—That would be so.

3324. In your opinion, and I suppose in the opinion of your directors, this being an advantage which might be secured by the establishment of hydrants as a system throughout your district, might I ask why your company has never carried that out; are you not responsible for that?—No; the company have been in former years most anxious for the improvement, especially because blame seems always to be attached to them for what is called in Captain Shaw's reports, the "unsatisfactory cases of water supply." I assure the Committee that the companies have done under present circumstances all that they possibly could to ensure the early attendance of their turncocks at fires. They give rewards to men who call the turncocks, and they pay the turncocks themselves for prompt attendance at fires an extra reward. They have the names of all the turncocks printed every quarter in large type, and put up in all the police stations and other places, that there may be no doubt about the residences of the turncocks, and with this care there are very few cases in which the turncocks are later at a fire than the engines. In a great majority of cases the turncock is there first. Of course if two persons have to run to a fire, the chances are that, other things being equal, they will each of them be as often late as the other, but I must say that the turncock is oftener in advance of the fireman than the fireman is in advance of the turncock; and if the water companies were making up a return of "unsatisfactory fire arrangements," they might put down a much larger number than Captain Shaw puts when he speaks of "unsatisfactory water arrangements."

3325. In fact, the company have endeavoured to minimise as far as possible the disadvantages which you admit to exist from the non-application of the system of hydrants?—I think they have.

3326. I suppose that the turncock's presence is of necessity one of the most importance?—It is most important, because, as things are at present, the firemen cannot act without him, but with hydrants all that difficulty disappears at once.

3327. Do you think it would be safe to have the pressure which is represented to be sufficient, not only in the City, but in the rest of your district, for mains are constantly charged?—You would in every case get a very efficient jet, and you would enable a fire, in a greater number of instances than now, to be put out by power direct from the main instead of by a steam engine; but still I hold that the great function and advantage of the hydrant is not to supersede the fire engine, but to supersede the turncock.

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3328. To get the additional security, as I said before, which those means would give you in addition to the means which you already possess?—Yes.

3329. Now, the water companies, as you have stated, are not responsible for this; have you applied to the authorities who are responsible, as a company, in order with them to establish a system which would be so advantageous?—We have, and I may say in two cases lately that our application to the Metropolitan Board of Works has been so far a successful one. In the case of the Northumberland Avenue, about this time last year, we requested the Metropolitan Board of Works to indicate the position in which they would have hydrants placed, and they did so, and as soon as the houses rise there the hydrants will be put. In another case of street improvement under the Metropolitan Board of Works we made application to them and asked them to point out the places for the hydrants, namely, in Great Eastern-street, and there hydrants have been placed. The hydrant which you see upon the table is the hydrant which the officers of the Metropolitan Board of Works have selected for that position.

3330. And these hydrants, to the number of 10, have been placed upon this new street by the Board upon the application of your company?—They have.

3331. Can you point out to the Committee what part of your district that is in?—It is the very eastern portion of the district, in Shoreditch; the eastern boundary of the New River Company's district is that part of Shoreditch, so we may consider it as a street passing westward from that eastern boundary.

3332. Is that in the green or pink part of the plan?—That is in the pink.

3333. And that is part of the district which will before long be supplied by the additional pressure to be gained from the reservoir coloured red?—It is.

3334. In what district of supply is Northumberland Avenue?—That is in the light-blue coloured part.

3335. From which reservoir is that fed?—That will be fed from the reservoir marked blue upon the yellow ground.

3336. In both those cases the pressure is equal to the pressure which you have in the City?—In one case equal, and in the other case, (that of the Northumberland Avenue) greater.

3337. But in both those cases they are only particular points in a large district supplied by this reservoir; would you tell the Committee that the mains generally being charged would all be available for the same purpose?—They would.

3338. With equal effect to the two points which have already been dealt with by the Metropolitan Board of Works?—They might.

3339. You have stated that on the table there is a hydrant which the Metropolitan Board of Works have adopted; can you give the Committee an idea of the difference between that hydrant and the one which has been adopted in the City?—The price of that hydrant was, I believe, 3 *l.* 18 *s.* 3 *d.*, as it stands.

3340. It has been stated to this Committee that the establishment of hydrants throughout London would entail an enormous expense; what do you consider would be the actual expense, not of that hydrant as it stands, but the fixing and putting down such a hydrant as that on the mains which you have at present charged in your district?—I think that with fixing, under ordinary circumstances, a hydrant of that kind would cost about 6 *l.*

3341. So that 10 *l.* would cover the expense of fixing and purchase?—I believe it would in many cases, and might be taken as the average. But in the City I am quite sure that the expense in many places will be more nearly 20 *l.*, because of the difficulty in executing the work.

3342. What you mean is that which was stated by the engineer that from the enormous day traffic, they have an additional difficulty in moving and altering the streets, and that they are obliged to work at nights with double gangs at greater cost than otherwise you might put them down with?—That is one cause of the extra cost, but another is the very expensive kinds of pavement which have to be cut through and made good.

3343. That class of pavement is being rapidly adopted throughout the town generally, is it not?—It is.

3344. Therefore that is one of the advantages you would hold out for an immediate application, if possible, of this system of hydrants before any change in paving of that kind makes it more expensive?—I think so; I think the sooner the better these hydrants are fixed, because of the increase of this expensive sort of paving.

3345. I think

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3345. I think you say that an average of about 10 *l.* would represent throughout the districts generally of your supply, the cost of placing these hydrants upon the mains?—I think I should be very safe in making that estimate for the whole of the metropolitan district at 10 *l.* per hydrant, as in country districts where little or no paving has to be interfered with, they could be laid down more cheaply. I know a country district beyond the metropolitan district boundary under the Edmonton Local Board where we had hydrants fixed, and the cost of the hydrants fixed there was a little over 5 *l.* a-piece. In the City it would often be something like 20 *l.* all fixed. Then you have to take into account the sort of hydrant provided; this is a hydrant 3½ inches which the Metropolitan Board have put down in Great Eastern-street. In the City they wish to have a much larger hydrant, with two outlets from it, in order to have a very abundant flow of water.

3346. So that there are some parts of London where you might suppose that the expense would not be much greater than it would be in the outlying districts, while there are others where costly pavement would have to be broken up and replaced, and you think that an average of 10 *l.* is a fair figure for the general supply?—I think so.

3347. Supposing you went beyond this suggestion, and that constant supply were given for all domestic purposes, what system of hydrants would you require for that?—The same hydrants.

3348. And what arrangement would you have to make?—The arrangement would be the same in attaching the hydrants to the main as in attaching the hydrants to the small service, the only difference being that the cost of cutting into the small service and making the attachment would be less than in the case of the main. If all the pipes, both mains and services, were constantly charged, upon all those pipes, hydrants might be placed, but it would be a very valuable instalment of the work if hydrants were immediately placed upon all of those larger mains which are now constantly charged.

3349. You might meet a great deal of that difficulty by doing that, leaving the general question of a constant supply to a future day?—You might.

3350. Can you give your reasons for the constant service not having become general throughout London?—It is not from any unwillingness on the part of the water companies to furnish a constant supply, but it is impossible to deliver water upon constant supply without an efficient preparation of the house fittings. It has been alleged that the companies have stood in the way of constant supply, that they have in fact by putting forth a set of regulations which have been said to be almost prohibitory of constant supply, forbidden it, but that is not so, the regulations which the company have in force in their district for the preparation of fittings in houses for constant supply are just such as you would find absolutely necessary in every town in which constant supply has to be given; they are not at all more stringent than the regulations of well-managed constant-service towns. In Glasgow, where the regulations are not carried out so stringently as in Manchester, the effect of constant service without efficient provision in the houses to receive constant supply is this, that the supply is more than 50 gallons per head per day. It is said that there must be a great deal of waste in London where the supply is about 30 gallons per head per day, but in Glasgow, with all the power of the corporation to compel the inhabitants there to take their water in the least wasteful way, they have not been able to bring down the consumption under 50 gallons per head per day.

3351. I suppose you are aware that they have in certain towns materially reduced their consumption of water by the introduction of the constant supply?—It is not the constancy of the supply which reduces the amount of consumption, but it is the strict supervision which, with the constant supply, must be given to all the house fittings.

3352. The inspection of the house fittings and the attention that has been paid to them you would represent reduced the consumption?—Yes, it is that which reduces it, not the constant supply; because constant supply given without very strict supervision over the fittings in the houses would always issue in tremendous waste.

3353. Do you represent that the reasons why the constant supply has not been generally introduced is, that the inhabitants themselves are not anxious for it?—I do not think that they are. But probably they would be glad to have it, if it could

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could be obtained by them without their making any outlay for it. Each of the companies in 1852 were required to make their works equal to constant supply and it was left to the consumer to choose whether he would have constant supply or not. Then the legislation of 1871 went a step further, and made provision for compelling consumers to prepare for constant supply, and it left the power of compulsion in the hands of four bodies. It permitted the company to initiate a constant supply; it permitted the Metropolitan Board of Works to do so, and it permitted the Corporation of London to do so; and, last of all another body, the Local Government Board. Each of those may initiate constant supply; but it has been felt that where consumers are unwilling it is a very unpleasant task to enforce constant supply upon them; therefore the thing has not been done, but it is not right to say that it has not been done simply from the companies' neglect. The companies have prepared their own works for constant supply, and are quite ready, if the public authority compelled preparation for constant supply by the consumer, to give what is wanted forthwith.

3354. You have stated that even supposing constant supply to be given for the purposes which we are now inquiring into with regard to fire, it would not be as great an advantage as the use of the mains with constant supply separated from the pipes for domestic purposes?—Where there are now mains the fire supply would be a better one with things as they are; but of course in streets without mains there is a difficulty until constant supply is there also.

3355. Then it would come to the question of supplying that difficulty by making branches which would practically be new mains?—Yes, quite so, as they have done in the City.

3356. You do not agree with the witnesses, who have stated to this Committee that with the existing pressure of the constant-service mains of the town, very great addition to that pressure must be attained before you could make hydrants useful for the purposes of extinguishing fires?—I do not agree with that at all, because the great advantage of a hydrant is in the prompt obtainment of water, rather than in the additional pressure you may obtain for a jet from the hydrant.

3357. The prompt obtainment of water, in fact, means very often the putting out of the fire before the engine arrives upon the spot?—Yes, it does.

3358. And to that extent the risk is very much diminished?—I am sure it would be.

3359. Is there any other point that you would desire to put before the Committee?—I would like to remark upon the requirements which have been proposed for a water supply in case of fire; that is to say, the requirements which Captain Shaw has mentioned.

3360. Captain Shaw, as I understood him, represented that he wanted a delivery of 2,100 gallons a minute from 14 supply outlets?—Yes.

3361. How would that operate in the system which is being established, and in the system which you suggest in the metropolitan area?—First of all the rate of delivery named by Captain Shaw of 2,100 gallons a minute is a very high rate; he said that it was a very small quantity of water; but small is a comparative term; really it is a very large supply; it is equivalent to 3,000,000 gallons per day, and that supply is more than a fourth of what the supply of the whole of Manchester is on the average. And Captain Shaw wants that to be delivered within a very small area; he wants it delivered within such an area that 14 lines of hose, having an aggregate length of half a mile, would be able to reach it and pick it up, and throw it on a fire.

3362. I suppose you agree with Mr. Bramwell when he stated that this demand of Captain Shaw's really represented when dealt with for 24 hours a 42nd part of the whole supply of the eight companies of London?—Quite so.

3363. That it was an exaggerated want to have to meet?—Yes; I quite think so.

3364. Can you state to the Committee what, in your opinion, will be the facilities given in the City to the fire brigade at any given point, by the system which is proposed and represented upon that map. I refer to the facilities relating to this demand by Captain Shaw as to the quantity of water which he says is necessary for coping with a fire. What amount of water would be secured by that system?—In a great many places in the New River Company's district,

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district, that quantity of 2,100 gallons per minute could be delivered at ground level. Some large fires have taken place at which I calculate that quantity of water has been delivered, but at ground level.

3365. When you say "delivered," what do you mean exactly?—I mean so as to be taken by the engines and pumped by the engines through their hose. I think one great reason why you must always retain the fire engines is this, that you have a great resistance to be overcome in the hose, and you also want an additional pressure for the jet; and if you put the two things together, the resistance of the water in the hose, and the extra pressure for throwing the water as a jet, then you have immediately a demand for 178 feet of extra head. I arrive at that in this way:—Mr. Bramwell's experiments show that the delivery through a hose, delivering 150 gallons per minute, as each of Captain Shaw's 14 lines of hose would do, would have a friction of three inches in every foot; every one of those lines of hose would require to be, on the average, 200 feet long, so that the friction through the hose would be equal to 50 feet. Mr. Bramwell has also shown that the power of "head" required must be such that the jet will bear to the "head" a proportion of five-eighths. If a jet is required of 80 feet (and I think if you are to do without the fire engines that would be the smallest jet you could possibly arrange for) you would require a head for that jet of 128 feet. Then you have the hose friction added to that, which makes the total extra head you demand for those two purposes, 178 feet. That is the total extra pressure which you require in addition to the pressure which you require to deliver 2,100 gallons at ground level. I think it ought to be enough to demand from the water companies that their whole quantity be delivered at ground level. Then the engines should be brought in to take the water up and force it through the length of hose and also to jet it. The power of the reservoir may be spent in different ways; the power of the reservoir may be all spent in delivering the water to the site of the fire, and there I think it is properly spent; but to require the reservoir to have an extra head for forcing it through the hose and also for jetting it to the height of 80 feet is asking more than it will be profitable to require, because if the water of the ordinary supply is all pumped up to an extra height of 178 feet, the extra cost of so pumping the whole of the water supplied in London would come to an enormous sum; more than 130,000 *l.* a year; and that sum for obtaining an extra pressure of 178 feet is simply laid out for the purpose of doing what is a very questionable thing, namely, dispensing with fire engines, because many witnesses who have been heard here have been very strongly of opinion that under any circumstances you must continue to use fire engines. Even in Manchester, where fire engines have had a better opportunity of being dispensed with than in London, there are, in proportion to the area of the place protected, more engines than there are here. I say you should take the area and not the population, for I do not think that the population has anything to do with the provision of fire engines. The fire engines ought to be supplied according to the area of the place to be protected, and taking that as your measure you find that there are more engines in Manchester in proportion to the are athan there are in London. Now putting all those things together, the cost of providing the extra pressure required by the hose and jet by reservoir pressure, instead of by the much cheaper method of fire engines, would be, in my opinion, bad economy. It is true you may say in one case the expense falls upon the company, and in the other upon the Metropolitan Board of Works, but as a matter of economy in the end it will all fall upon the public, so that it would be bad economy to furnish the extra pressure from the reservoir, instead of leaving that pressure as now to be got by the pumping of fire engines. Let it be jetted through the hose, as often as you can, by mere reservoir pressure, but still retain your fire-engine establishment, and do not ask for that excessive pressure, which would be a difficult thing to manage, and would cause the consumers a good deal of worry and a great deal of expense for fittings beyond what they should be subject to.

3366. The evidence of the engineer of the City went to show that, whether the test had been applied by using one or two hydrants, the pressure was quite sufficient to maintain the jet and overcome the friction through the hose, which he stated was 40 feet, and still there was a sufficient jet to be useful in case of fire; do you represent that if you had to supply a demand, such as Captain Shaw

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has made under the present system, your supply would still be serviceable, because it would supply the engines at the rate he requires?—Yes.

3367. The fact that you do not approve of getting rid of the engines and using the hose simply from the hydrants in fires of any magnitude, does not in the least diminish your idea of the utility of these hydrants as applied to your present system; you say that they may be exceedingly useful both for supplying the engines and for doing what was proved to be, both in the Temple and in the City, possible, namely, throwing a good stream of water upon a fire through a hose applied to the hydrant itself?—Precisely so. But I think I may venture to say that the quantity of 2,100 gallons per minute would not be obtainable generally even in Manchester. You have it in evidence that the hydrants in Manchester are placed upon 5-inch and 3-inch pipes, and if you take a flow of 2,100 gallons through a 5-inch pipe to give the pressure required for such flow through only 200 yards of such pipe, you would need a reservoir 1,000 feet in height.

3368. What you really mean is, that the demand for that quantity of water is, perhaps, an excessive demand for most fires, but that it could be supplied, in your opinion, upon the ground level to that extent under the present system if hydrants were used; but as that would not be the ordinary requirement, in your opinion, a better supply and available through the hose would be secured by the establishment of hydrants?—A better supply would certainly be secured by the use of these hydrants, and in most cases I think 2,100 gallons could be delivered per minute on the ground level.

3369. Is there any other point which you would wish to represent to the Committee?—There does not occur to me any other point at present.

3370. Mr. *Onslow*.] The Committee have had it in evidence that the height of the houses at present being built in London is very much more than it was in former years?—It has increased very much.

3371. I suppose, from your evidence, I may conclude that it would be almost impossible, whatever pressure you have, to have a sufficient force to meet the requirements of the fire brigade of Captain Shaw in the case of a fire occurring in the top storey of one of these houses?—It would not be possible to have 14 jets going from the same pipe to a height of 120 feet.

3372. In the district supplied by your company, are there many of these houses built or being built?—There are several high houses lately built, and being built, in the City.

3373. Under your supply?—Yes.

3374. Have you ever considered the question of the amalgamation of all the water companies in London?—I have not. But I may say, in connection with that subject, there has been a suggestion that the works of the companies ought to be so connected that they could assist one another in the case of fire, but I do not know whether that is the point to which your question had reference.

3375. That is the point?—That suggestion has very often been made, and was carried out in the case of the West Middlesex and New River Companies many years ago. I have always felt that the suggestion, although it seems a very plausible one, is one with very little practical value in it. The New River Company have made a connection with the West Middlesex Company, but there never has been any occasion, either on one side or the other, to make use of it, and I hardly know on what occasion it would be necessary to make use of it. If anything happens to a local main, and no supply can be obtained from it, no assistance obtained from a distant company would avail, and that is the thing most to be feared. While a main in a street is disabled, no water can be delivered in that street at all, and no help from a distant company would be of any use.

3376. May I ask what was your reason for connecting yourself with the West Middlesex Company?—It was thought, I suppose, many years ago that it might be an additional security, and therefore it was tried, but though tried so long ago it has never been found of any service.

3377. Was it an expensive process?—No, it was just the connection of two large mains.

3378. I think I understood you to say that comparing London with other large towns you consider the pressure is as good or better than that prevailing in other large towns?—I think, in the New River district especially, that the pressure is upon the whole better than in most large towns.

3379. When

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3379. When you say London, do you mean London only, or only the metropolitan district?—I had special reference to the New River Company as representing them, but I also think that they have in other districts what is really a very adequate pressure.

3380. As good as prevails in Manchester or Brighton?—Not as good as prevails at Manchester; there are natural advantages in Manchester, and the corporation of Manchester availed themselves of those natural advantages under very skilful advice. The very best that can be done for water supply is done there, but I am quite sure that in Manchester generally Captain Shaw's requirements could not be met; if water is to be delivered in the quantity that he proposes to the height of the highest houses by jet, I do not think that even in Manchester you could get the thing done.

3381. Considering the enormous value of property in London, is it your opinion that the pressure should be better than in other towns?—I think while you have fire engines to give the pressure which is required by hose and by jet, you have all that you need, if only there is a sufficient quantity of water deliverable at the ground level.

3382. In regulating your pressure, do you only consider the requirements of the public for water for domestic purposes, or also for protection from fire?—Not exclusively for domestic purposes (though I believe legally we are not bound to do more than to provide sufficient for domestic purposes), but we have always taken a liberal view in laying down new mains to have them of such size that they shall be also a sufficient protection in the case of an ordinary fire.

3383. That is done on your own account; there is nothing in any Act to compel you to do that?—We are not compelled to give more than the ordinary domestic supply which the place may need.

3384. You have read the evidence of Mr. Tozer for Manchester last year?—I have.

3385. He gave the Committee some practical experience regarding the laying down of the hydrants, and the number of times the fire engines were called for the large number of fires, 292, in the Manchester district; he states the engines were only called out seven times; now, you have had no practical experience, the same as Mr. Tozer has; yours is merely what you yourself consider as a matter of fact theory?—Of course I have no experience as a fireman. I have the statistics of fires which take place in the New River Company's district, for we keep very accurate records of everything that occurs in the district, and perhaps from that record I could give what would be useful on that point.

3386. Are you referring to the metropolitan area of the New River Company's district, or outside?—My figures include the whole area, but there have been hardly any fires in the suburban district; therefore they may be taken as occurring almost entirely in the metropolitan area. There were, in 1876, 11 fires at which the turncocks attended without there being a fireman present. They were only small matters, and the fires were put out without the attendance of firemen. There were 154 fires at which the firemen attended without having to bring their engines; there were 275 fires at which the firemen attended without using their engines; there were six fires at which steam fire-engines only were used; 26 fires at which manual engines were used; 44 fires extinguished by means of a stand-pipe or jet from a plug, and 19 fires where steam and manual engines worked together; six fires occurred where the steamers worked along with stand-pipes; four where manual engines worked along with stand-pipes, and 24 fires where steamers, manual engines, and stand-pipes were used together.

3387. In those fires which were put out without any extra appliances, I suppose buckets of water were thrown, or something of that kind?—Not in every case, in which there were no fire engines, for there were 44 cases of fire put out by a jet obtained from a stand-pipe inserted in a plughole.

3388. Mr. Berrey, who is a civil engineer, was asked: "However, from your experience in Manchester, you are of opinion that hydrants are very superior to any steam fire engines?" To which he replied: "Yes; steam fire engines are only used as auxiliaries at enormous fires, or where you have difficulty of access, but hydrants are imperatively necessary in a large community like London, if you are to extinguish fire, and obtain the water at the earliest time." Do you

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you agree with that evidence?—I quite agree with it, because I think the great advantage is in that which is expressed in the last words of his sentence; it is by the hydrant you get water at the earliest time, and I have no doubt that if you had hydrants without increased pressure you would reduce the number of cases very much in which engines would be needed at all.

3389. Supposing a pressure, by Act of Parliament, was demanded of only 40 feet, would you recommend putting down hydrants in any district?—Certainly.

3390. The East London Waterworks Company, I believe, have only a pressure of 40 feet?—They have only a pressure of 40 feet, but their district is a very level district, and I have no doubt 40 feet is quite adequate pressure for the supply of the houses within it; and with hydrants and that 40 feet pressure, there would be abundant supply for fire-engine purposes, and even in some cases to throw a jet where the fire is not a great distance from the ground.

3391. You agree with Mr. Bramwell's figure, that 5-8ths is often all the jet you would get from the head?—I put it that you often get more than 5-8ths, but very often it is interfered with by the wind, or by the bad construction of the nozzle.

3392. Mr. Bramwell does not think it would be of any use putting down hydrants if the pressure was only 40 feet, or less; that it would be a waste of money?—I think you would have this advantage from the laying down of hydrants, that you would have the immediate obtainment of water.

3393. Even though the pressure were only 40 feet, yet I presume there may be cases in which it would be impossible for that height to be reached on account of the distance from the main, and on account of the friction, or other causes?—Of course there may be; in a small-sized pipe you would not have the full advantage of the head that you possessed from the reservoir, but the engineer of the East London Water Company will probably give evidence and will be able to give the Committee details as regards his own district, but I speak upon the general question.

3394. I understood you to say that, in your opinion, the number of engines in the town should be regulated according to the area?—I think it should be rather according to the area than according to the population. I noticed a calculation made of the number of engines according to the population; but it appeared to me that it would be a truer way of doing it to calculate the number according to area.

3395. You would leave out the question of the value of property?—I assume all property requires to be protected.

3396. Sir *Henry Peek.*] I take it that you are an eminently practical man on this subject?—I have had to do with water supply for many years.

3397. You have, I presume, with great interest read the evidence that has been given before this Committee?—I have read it as it came out.

3398. Could you point out to the Committee any material errors or discrepancies in that evidence, because a *précis* will have to be made of the evidence which eminent men have given here, and if you see any points with which you cannot concur it might be as well to state them?—I have noticed them in the evidence, though what I have already said would perhaps include most of them. One witness said hydrants were not so good as plugs, and another said they were equal to plugs; there was one remark made which I think ought to be corrected that there was hardly any supply in London by gravitation. Now the fact is that it is completely gravitation as regards the New River Company's district; the water of the New River Company has of course to be pumped first, because it has to be raised up to the reservoirs, but it afterwards descends by gravitation. In Manchester, however, they have the advantage of having their source of supply at a very great height, and they have simply to let their water down, but we have to begin by raising it all up, but once it is raised to these service reservoirs it is as completely a gravitation supply as that of Manchester.

3399. Sir *James M'Garel-Hogg.*] Will you give the Committee the number of the question, and the statement you wish to correct?—I think the number of the question was 4693.

3400. Sir *Henry Peek.*] Question 4693 was: "You would say that a small part of the Kent Waterworks Company, which applies to the district of Deptford, Greenwich, and Woolwich, is the only part of the Kent Water Company's district

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district where a pressure is maintained sufficient to enable you to use the hydrants in the way you would wish? *A*. I should not like to answer the question so definitely as that, but I doubt if there are any parts of the metropolis where they have any great pressure by gravitation; their pressure is always produced by pumping, and then it is very uncertain indeed"; that is Mr. Richardson's evidence?—That is not the case in the New River Company's district, because the whole of the supply is by gravitation. I did not also understand the remark made (I do not know by whom), that the supply, though fairly good at first, almost always falls off; that I do not understand, because there is no reason why the supply should fall off after it is first drawn from the New River plugs.

3401. There is so great a head that it could go on continuously?—It is not the amount of the head, but that the supply is by gravitation as in Manchester; while there is a drop of water to run down it will come; and that remark about pressure failing is rather contrary to what Captain Shaw pointed out, justly enough, that upon the present intermittent system there is an interval after the plug is first drawn, when as domestic cisterns are being filled, the pressure is not so great; but this does not amount to much, because most cisterns are above the ground level, and when the plug is drawn, the whole of the water usually comes out at once at the street surface, and does not go to the cisterns first.

3402. Has your attention been called to the sinking of the well at Meux's Brewery?—I have seen the published accounts, and I also know something of the matter from inquiry.

3403. Is it true that if they have struck that stratum the water will rise to the surface?—I think it is very likely, but it is a point to be proved. I have been conducting an experiment of the same kind for the New River Company. It was a proposal made by me in the year 1866 that the New River Company should make an attempt to obtain water from the lower green sand, where it is supposed to be pure, soft, and abundant. For some time we have been engaged in sinking a well in Hertfordshire, and a very large one; it is the largest one that has been attempted, and we hope some day to get at the green sand.. At Meux's they have been carrying on the process by the diamond rock borer, and by using the diamond rock borer they have been able to go on more rapidly than we have been in Hertfordshire.

3404. What depth have you got to?—We are now 808 feet. I should explain why the New River Company's well was attempted without the diamond rock borer. When we began our works the Rock Boring Company were not in a position to do any boring of the size that was required; they had had the idea of prospecting for mines merely, and they could offer me no larger crown than about 3 inches in diameter, which for a water company's purpose is insufficient, and I determined to begin with a large bore, so that the reductions which take place when a great depth is reached by putting one tube inside another might not reduce the bore at the bottom to so small an area. I began with a diameter of 34 inches, and carried it right through the chalk and some distance below the chalk, and after getting into the upper green sand I began to tube, and am now tubing with tubes 26 inches in diameter, and that work is progressing, and my calculation was that when we reached the lower green sand the water would rise considerably above the surface, so as to deliver itself into the channel of the river without pumping; but that is an experiment the result of which has yet to be proved.

3405. Do you think that that experiment of yours will probably succeed?—I think so.

3406. That you will get water above the surface?—I think so.

3407. That would have a very important bearing on the objects of this Committee, because if you could bore, and Meux's have bored, there might be a great many wells sunk, might there not?—I do not suppose the height to which the water would rise above the surface would be one which you could use for fire purposes. It would deliver a quantity of water, but that water will require still to be pumped as now; it is merely a question of the quantity of water, and I think the question of quantity is not much the concern of this Committee, for there is a great deal more water every day in London now than a fire can ever require.

3408. If I understood you rightly you stated that a great deal of your water

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came to your consumers by means of gravitation. If these wells were sunk, as I believe Meux's is, some 100 feet above parts of the metropolis, then you have a force of gravitation at once sufficient to force that water up to 60 or 70 feet?—To what height it will rise I do not know. It may rise 20 or 30 feet from the surface, and if we have for gravitation purposes to put water into a reservoir 200 feet high, you cannot expect the green sand pressure to do that.

3409. I understand you to say distinctly that you are of opinion that fire engines should be retained?—I think they ought to be retained.

3410. Does it not follow that a good deal of the expense which is now being incurred by the City will be money thrown away?—I think not, because they have felt that the great thing is not the dispensing with fire engines. The great thing is to obtain water immediately, and that the hydrant will enable them to do.

3411. Mr. *Clifton.*] I wish to ask you one question about the artesian well. Do you know anything about the history of wells in Paris; namely, those at Passy and Grenelle?—I read the accounts of the sinking of those wells.

3412. Do you happen to know as a matter of fact that when the well at Passy was opened, the well at Grenelle left off its supply?—It was affected by it. I am quite aware that wells which communicate with one another through so permeable a stratum as the lower green sand will probably affect one another.

3413. Have you seen the core which the diamond rock boring extracts?—Yes, I have seen the core they are now able to take out; a core about a foot in diameter.

3414. What is the size of your tubes?—Twenty-six inches.

3415. Mr. *Stewart Hardy.*] One of the great objections which has been raised to the putting down of hydrants has been the expense?—Yes, I am aware of that.

3416. Would it, in your opinion, be necessary to put down anything like the hydrants in the outlying and poorer districts of London which are necessary in the City?—I think not; and there must be great judgment exercised in selecting the position for hydrants. Where there is much valuable property and high buildings, they must be much closer to one another than in the outskirts.

3417. In the case of hydrants, wherever they are, even if the pressure is not equal to 80 feet, there would always be a better pressure at all events than there is at present?—There would be a better pressure than at present, because a hydrant has a larger area than the plug.

3418. Could hydrants be put very cheaply in most districts, if the people putting them down were content to place them as the plug is in the centre of the road?—Yes, if they were placed immediately on the pipe they were connected with, that would cost less than where they have to be branched to the footway, but no doubt there is a great convenience in a crowded thoroughfare in having a hydrant on the side walk.

3419. But though it is a matter of convenience, yet as a matter of fact fires occurring principally at night, the traffic being stopped while the fire was going on, they would offer no obstruction to the traffic?—No, but there is the objection of the iron-boxes which are required to cover the hydrant, and where there is wheel traffic those iron-boxes would be a great objection.

3420. You think the saving to be effected by placing them in the centre of the road would be undesirable?—I think it would be undesirable to effect it.

3421. There was a case in which a complaint was made with regard to a fire at which four turncocks were absent?—I believe what the Committee heard was quite correctly stated from inquiry I have made. Both men belonging to the district were ill, and a substitute was put in their place; the constable went first to the turncock of the district, and then he went to his deputy; both were ill in bed and consequently not able to attend, and he had then to go to a third man, who was at that moment called out to attend to some difficulty of water supply in an adjoining house; he did not go without leaving a person in his place, who immediately went for him, and he was obtained and reached the fire as soon as the fourth man, whom the policeman called, but all this shows that with the very

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very best arrangements without hydrants there may be a delay in finding the turncock and getting him first to the fire.

3422. Sir *James M'Garel-Hogg.*] Can you give the same pressure in every part of your district as you can in the City?—It is not the same; it varies throughout the district, but there are many places outside the City where the pressure is better than in the City. For the sake of making that matter of pressure a little clearer to the eye, I have brought with me a model which was made a good many years ago, but it represents truly the company's district; it is made to scale and will show the variations of level, and with the variations of level such as that model represents, it is quite clear the pressure must vary all over the district supplied from any one reservoir.

3423. Could you give any idea of the difference?—In the City the pressures were given the other day by Mr. Haywood. They were made without my having anything to do with them. I believe them to be strictly correct.

3424. And outside?—Outside the City there are gaugings showing it to be very much above that; 150 and 120 feet is not an unusual pressure in some of those parts coloured blue.

3425. Where is there a higher pressure than in the City?—In most of the blue district.

3426. Will you indicate where it is lower, and how much lower it is?—I do not think that there are any places where the pressure is lower than in some portions of the City. I think you have a minimum pressure in some portions of the City.

3427. The New River Company are in a very favourable position as regards pressure. They have a better pressure than most of the other companies?—They are in a better position in this respect than the other companies; the Lambeth, at least, excepted.

3428. There are few companies who have so large reservoirs?—There are few.

3429. You said something about the friction of the pipe reducing the jet; can you give any data from your own experience how much it would be reduced, say by passing through 200 feet of hose?—I have no reason to question Mr. Bramwell's experiments. I made similar experiments with Mr. Braidwood many years ago, and I believe that with 150 gallons per minute you would have a friction very similar to what Mr. Bramwell represented.

3430. You would confirm Mr. Bramwell's evidence in that respect?—I would confirm his evidence in that respect, only I would use it for the purpose of showing the desirability of having a steam fire engine or a manual engine to overcome the friction rather than of raising the pressure all over the district to do so.

3431. You do not think that the putting down of hydrants would in any way reduce the cost of the fire brigade?—I think it might, because the fire engines would not be so frequently called to fires if water could be obtained.. I think it would be an imprudent thing to reduce the number of engines, but I think they might not always be required.

3432. You would keep the same number of engines and the same number of men, and the same number of stations?—I think that whatever you do, it will still be necessary to keep up the staff.

3433. So that hydrants would be a cost beyond the staff?—I think there might be some saving made.

3434. Would it be anything beyond a less wear and tear of the wheels?—There would be less payment for working.

3435. You told the Committee that the cost of hydrants for the City would be about 20 *l.* each?—Yes, in the leading thoroughfares.

3436. In the Northumberland Avenue the cost comes to about 10 *l.* altogether, including the fixing?—They have not yet been fixed there. Some difficulty has arisen about the arrangement of the pipes in the subway, and the cost of attaching hydrants to the pipes in the subway will be much greater than if they had been laid in the ordinary way in the street.

3437. Do not you think in Oxford-street and Regent-street the same cost would attach to laying down a hydrant as in the City?—The cost would be quite as great as in some portions of the City. I speak of the heavier price of 20 *l.* as in the City where the traffic is very heavy, where the work would require to

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be done at night, and where expensive asphalte or wood pavement would require to be taken up and re-laid.

3438. Have you ever considered how many hydrants would be required for the whole of London?—That is a very important question, and very much would depend upon the use of or the giving up of the use of fire engines. If fire engines are not to be used, but water is to be obtained by lines of hose from hydrants, the hydrants will require to be very much nearer to one another than if you employ engines. With a hydrant and engines the water could be run to the spot where the engines stand, and you can do that by a distant hydrant; but where you have to bring water from a hydrant through hose direct to the fire, you must have that hydrant very near to be effective; and to carry out what Captain Shaw has laid down as his requisite, namely, 14 lines of hose reaching together to half a mile, I think it would require the hydrants to be 35 yards apart; you would therefore need hydrants to the number of 50 to the mile.

3439. Do you mean on both sides of the street?—I am supposing that you have one on this side and the next on the other, but between hydrant and hydrant you must not have more than 35 yards.

3440. Have you calculated at all how many would be required in the whole of London, taking your own average?—I am now pointing out that to carry out the requirements of Captain Shaw delivering 2,100 gallons per minute through 14 lines of hose of an aggregate length of half a mile, you require the hydrants to be 50 to the mile, and if there are 1,500 miles of streets in London, as has been stated by the Registrar General, you would require 75,000 hydrants for the whole of London.

3441. I think I understand you to state that you would only put hydrants on the constantly charged mains?—You do not get the full advantage of a hydrant unless it is upon a constantly charged main. If you did place it upon an intermittently charged pipe (or service, as we call it), you would have the advantage of a greater area of delivery, but there would still be the same difficulty as now in finding the cock which commands the hydrant.

3442. When you refer to 1,500 miles of streets, does that represent the Metropolitan Board of Works area, or the Metropolitan Police area?—I think the Registrar General calls it the Registration area.

3443. I understand there are 1,500 miles of streets in the metropolitian area?—I am not sure about that.

3444. To provide the whole of that district with hydrants, with the same degree of efficiency with which it is proposed the City should be supplied, would it not be necessary to lay a good many branches for the service of those streets which are not reached by the mains, which you have said are constantly charged?—Yes.

3445. That would be done at a considerable extra cost to the cost of the hydrant itself?—The branches would add to the cost of the hydrant.

3446. Do you give a constant supply to the houses in your district?—Yes, to some.

3447. Can you point out which are the districts to which you give a constant supply—They are not in any one district; they are dotted about here and there; there are some thousands which have a constant supply.

3448. What regulations do you propose?—The regulations which were passed in 1872.

3449. That was under Lord Methven's Commission?—Yes.

3450. I think there was a little objection to that regulation which the companies introduced before that?—There was an objection: it was supposed that as originally proposed they were far too stringent, and certain modifications were made.

3451. Have you ever thought how much it would cost per house to carry out the regulations in your district?—I made an estimate many years ago with regard to that; but the average cost of altering the fittings in London for the proper preparation for constant supply is a very difficult figure to arrive at. The figure I arrived at was 8 *l.* per house; in the lower class of houses the cost would be very small, and of course in larger houses the cost would be very much greater.

3452. I think that when it was gone into by others even a higher figure was arrived at?—It may have been arrived at by others, but my figure was 8 *l.* per house for making all the alterations.

3453. You

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3453. You stated with regard to the non-attendance of the turncock at fires, that if the companies chose they might make sometimes a return of the "unsatisfactory arrangements at fires," on the part of the fire brigade; will you explain what you meant by that statement?—I meant merely this, that when the turncocks are behind the firemen at a fire, Captain Shaw puts in his report, "unsatisfactory water arrangements." I say that in a great many more cases the firemen are behind the turncocks, and I might write below these "unsatisfactory fire arrangements;" one of them must be late.

3454. Are the regulations in your district more stringent or not than those in Liverpool, with regard to changing from constant supply to intermittent supply?—I do not know much about the Liverpool arrangements; I do not think they have a very strict code of regulations, but the regulations in London are not so strict as those in Manchester.

3455. You said something about the delivery not being so good on account of the bad construction of the nozzle; can you give me any instance of bad delivery?—I can give you no instance of any bad delivery from any faulty construction of the nozzle used by the fire brigade, but it was as explanation of the very low figure which Mr. Bramwell put as the height of the jet as against the head that I was led to say that in fixing the 5-8th he probably took into account not only wind, but badness of nozzle and other things which might interfere with the full delivery of a good jet.

3456. Mr. *Hayter.*] Do you agree with Mr. Haywood that the number of hydrants should vary with the density of the population?—I think the number of hydrants should vary with the closeness in which the houses are placed to one another; there are portions of our roads in the outer parts, even in the metropolitan area, in which houses are detached, and there may be spaces without houses, and of course it will be useless there to place hydrants. In a place like the City, with houses continuously arranged, hydrants ought to be more closely set.

3457. I ask you whether you would propose to place hydrants at 60 yards intervals in the suburban parts?—I think, perhaps, it would be hardly necessary in the suburban parts, but in the City, where the houses are in a continuous line, it would be necessary to have them at that distance at least. Where there is very valuable property, you require to concentrate at one spot a certain supply, and perhaps it might be desirable, in some places, even to have them nearer than 180 feet.

3458. Mr. *M'Lagan.*] In making a calculation with reference to the number of hydrants which would be required according to Captain Shaw's estimate, I think you stated that 75,000 would be required, supposing them to be put at 35 yards distance?—Yes.

3459. But that was assuming that the 35 yards were to be in a line, not zig-zag from one side of the street to the other?—The amount of zig-zag by having the hydrants alternated on each side of a street would make very little difference in the number of hydrants required. I think that if in every 35 yards of length of street you have a hydrant, that would be a very ample supply.

3460. You stated that if hydrants were placed as suggested, you would still require fire engines; that you would not reduce the number of them at all events?—I would not reduce the number of them.

3461. But would you require the large power of fire engines which we have been told would be required for the metropolis?—You will still require large engines for great fires; all I say is that you would not require to take them out so often.

3462. It has been stated to the Committee that we should require to increase not only the number of engines but the number of firemen; do I understand that you would increase the number of engines and firemen, or would you be content with the present number?—That is an important question for the fire brigade with reference to the amount of protection which is required by engines; all I say is that if you provide hydrants it will still be necessary to retain your engine staff to meet those cases in which hydrants alone will not cope with a fire.

3463. Then I understand you that hydrants alone will not be sufficient for putting the City under protection from fire?—I think the provision of hydrants is not for the sake of saving money on fire engines; it is for the sake of providing very much better protection. It is the certain way in which you obtain the water which is the advantage of a hydrant—its checking a fire at the very first. If you save

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nothing in the provision for the extinction of fire you will reduce the loss which occurs by fire very materially by providing hydrants, and by obtaining through them the immediate application of water.

3464. If by the application of hydrants you were able to put out fires by the immediate application of water, you would have less big fires, therefore you would not require the same number of engines?—The superintendent of the fire brigade may come to that conclusion; it is rather a question for him.

3465. Mr. *Forsyth.*] Could you give any idea of what would be the cost of sinking an artesian well of the depth of the one at Meux's Brewery?—I cannot.

3466. What has it cost you to sink that well as far as it has gone in Hertfordshire?—The one in Hertfordshire is not a mere bore into this green sand; there is a very large chalk well, and at the two sides of that chalk well there are long tunnels driven into the chalk for the purpose of obtaining the chalk water; all that has added enormously to the cost of the well, and I am unable to say what the boring into the green sand will cost.

3467. What has it cost you already?—I should suppose 10,000 *l.*

3468. Mr. *Ritchie.*] Do you know what distance apart they are going to lay down these hydrants in the City?—One hundred and eighty feet apart.

3469. You consider, I suppose, that the City requires as much protection from fire as any other part of the metropolis?—Yes.

3470. Do not you consider that the 60 yards apart which they propose to put them down in the City will afford a sufficient protection to the City?—I think so, if you retain the fire engines; I pointed out that it was in doing away with fire engines, and relying alone upon hydrants, that you required the hydrants to be so near together as 35 yards.

3471. Then with hydrants as near together as 35 yards apart, you contemplate doing away altogether with the fire engines?—No; I would still retain the fire engines, but I would point out that if you had them not, and want to fulfil Captain Shaw's requirements of 14 lengths of hose within half a mile of aggregate length, you must have them at 35 yards apart.

3472. I would like to draw your attention to Question 879, which was put to Mr. Heywood, of the City; does not Mr. Heywood there say that with his hydrants at 60 yards apart he is able to fulfil Captain Shaw's requirements in that respect?—Mr. Heywood says, "We can get in Fleet-street at this particular spot (and it is a fair average of the main streets in the City) 14 nozzles; that is to say, 7 hydrants with two outlets to each, with an aggregate length of 2,860 feet of hose." This is some diagram which he produced, and without seeing the diagram I cannot understand it.

3473. Mr. Heywood says that with his hydrants, as he proposes to put them down 60 yards apart, he is able to fulfil Captain Shaw's requirements; does he in effect say that he is able to do that?—He does.

3474. You are not able to agree with that?—No; from not understanding it till I see his diagram.

3475. But you have gone into the question?—Yes.

3476. Your experiments have led you to believe that the hydrants, in order to meet Captain Shaw's requirements, must be 35 yards apart?—Yes.

3477. Granting the high pressure, that would bring sufficient force to bear upon any one fire throughout the metropolis sufficient to dispense with engines, would it not?—I think not. I still say that engines ought not to be dispensed with, even if you have hydrants as close as 35 yards apart.

3478. Then even with hydrants as close as 35 yards apart, would you contemplate retaining the staff, such as we have at present and the engines, or would you reduce it?—I would have the engines, and not place the hydrants so near to one another.

3479. Have you told the Committee how close you would put the hydrants with the present engines?—No; their closeness is, with engines, a matter of less consequence. I think what they are doing in the City would answer every purpose.

3480. That would reduce the number of hydrants which you mention by very nearly one-half?—Yes.

3481. So that if your advice were carried out, you would advise putting down something like 40,000 hydrants?—You quite understand that I would not prescribe the distance between hydrant and hydrant. The distance adopted in the City has been adopted by the City authorities themselves. The Companies are

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are quite willing to allow hydrants to be put at any distance that is thought proper, and it is by no advice of ours that the distance which has been adopted in the City has been adopted.

3482. You have stated that you have gone carefully into the question of how many hydrants would be necessary, and you think that hydrants every 35 yards would be the most advisable mode of proceeding?—I did not put it quite in that way; I simply said that if Captain Shaw's requirements had to be met, without engines you would require the hydrants to be 35 yards apart; and I said in another part of my evidence that if you dispense with engines, you must enormously increase the pressure besides.

3483. I may take it, then, that according to Captain Shaw, if we had hydrants every 35 yards, there would be no necessity for engines?—Assuming the pressure.

3484. Then, according to Captain Shaw, 75,000 hydrants throughout the metropolis would do away with the necessity of fire engines under a system of high pressure?—Having added to the pressure in the manner I have already explained.

3485. Now, having gone into the question of how many hydrants would be required to meet Captain Shaw's views, I ask whether you could not tell the Committee, as the result of your investigations, how many hydrants you would put down if you still retained the present staff of engines?—I would be very much inclined to follow out what the City have proposed; 180 feet, I think, is a very good average.

3486. Taking the present state of things as continuing, that would reduce the number of hydrants mentioned by you from 75,000 to about 40,000?—Yes.

3487. Would you consider it necessary to protect the whole of London in the same way as you would protect the City?—No; I think there must be a very great difference in the way that hydrants are placed in the heart of the City as compared with the outside suburban portions.

3488. So that will still further reduce the number of hydrants from 40,000:—I think it might, but I would rather put it thus: that 180 feet might be assumed as a very good average distance for hydrants in what may be called the urban portions of London. In the outer portions there are certainly many roads where I think hydrants need not be so closely laid down.

3489. In that 1,500 miles, is the area of the City included?—It is in the Registrar General's return, and I thought he gave it as the length of road or street in what he called the Registration division.

3490. Of course in that return the City would necessarily be included?—Yes.

3491. So you would, in calculating the number of hydrants, still further reduce it by the number of hydrants which there are in the City?—Yes, exactly.

3492. You gave some answer with regard to the engines which, I presume, is also applicable to the question of hydrants, that not the population is to be taken into account, but the area?—Yes.

3493. But you would take into account the question whether the area was densely built upon, or the reverse, would you not?—Yes.

3494. That would form a portion of the calculation?—Yes, in setting the hydrants; but I think it is the distance from the station where property could be burnt down that should be considered in the planting of engines.

3495. I take it with regard to hydrants, that that would apply more to them than to the question of engines?—Yes.

3496. Do you know how many houses there are supplied with water in the metropolis?—There are about 520,000.

3497. May I take it that, in your opinion, it would cost something like 4,000,000 *l.* to alter the fittings of the houses throughout the metropolis?—At 8 *l.* a house it would; that was the estimate I made some years ago; I have not gone into the matter recently; I have no doubt things are very much now as they were then.

3498. Have you taken the houses supplied by your company, or generally throughout London?—Generally; it is a figure very difficult to arrive at; it was the roughest possible estimate, but I have reason to believe, taking the smaller amount required for the lower-class houses, and the heavier amount required for the houses in the West End, that the amount of 8 *l.* would probably be required to put houses in a state to receive constant supply.

3499. Are there not many houses in a state which would take that constant

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supply without any alteration?—The regulations have been enforced since the year 1872, and under those regulations improvements have been made which will reduce to some extent the outlay to be incurred.

3500. I may assume from your evidence that you consider it would be well worth while even now to put down hydrants throughout London for the purpose of getting more readily at water?—I think it well worth while, because at present, in all leading streets, there is a constantly charged main at good pressure, and it would be a very large instalment of a valuable provision to have hydrants laid down on those mains, leaving for the present the question of the extension of the hydrants into the side streets.

3501. You think that, instead of waiting until the whole of London is supplied with a constant supply before putting hydrants down, it would be advisable at once to proceed to put down hydrants on those pipes where constant supply can at present be obtained?—I think so. I see no reason at all why you should do nothing because you cannot do everything. There will be a great gain in having hydrants upon the mains.

3502. Do you know anything about the provision of hydrants in Glasgow?—I do not know much about Glasgow with respect to hydrants. I know the pressure there.

3503. Do you know the distance they are apart in Glasgow?—No; I cannot speak to that.

3504. *Chairman.*] In answer to the honourable Baronet who represents the Metropolitan Board of Works, you stated that the number of stations and engines would still have to be maintained the same, notwithstanding the introduction of hydrants?—I feel it to be a little out of my department to say anything about fire engines, but I think that whatever hydrant provision is made, it should not at all reduce the provision of fire engines, except to the extent to which fire engines may be reduced in numbers, by the fact that when the hydrants are on all these constantly-charged pipes, there would be less work required from the engines.

3505. But the object of this inquiry is not so much to ascertain whether we can reduce the existing staff of engines, as to see whether we can better protect the town and its population from fire by supplementing the existing system, and what you represent is, that by establishing a system of hydrants you are giving that greater security; you do not put it as a substitute for the existing state of things?—Not at all as a substitute, but it would be a very valuable supplement.

3506. To secure the same protection as you would give by this system of hydrants, you would have immensely to increase the existing staff of the brigade?—I think so.

3507. With regard to your well; you stated that you were sinking your well through your chalk supply of water?—Yes.

3508. Can you tell the Committee what is your daily supply from that chalk well at present?—Probably between 2,000,000 and 3,000,000 gallons a day, obtainable from the chalk alone; but I speak with uncertainty, because the well, owing to the boring operations, has not been latterly in use, and since the bore has been carried down to the bottom of the chalk there have probable been large accessions to the chalk supply, of which I know nothing. It yielded some years ago 2,000,000 gallons a day. I am hoping we may now have half a million gallons more, in consequence of more chalk being exposed by the bore that has gone through it.

3509. Mr. *Onslow* (through the *Chairman*).] How soon do you think you will be able to attain the depth which Meux's brewery attained?—That is a question which I am very anxious to get an answer to.

3510. You have no idea at all?—No; it is very heavy work at that depth.

3511. *Chairman.*] In sinking this well you stated that fresh supplies have been opened; does the sinking go through a fresh stratum of chalk?—It is, of course, the same deep bed of chalk, but every now and then, by cutting through layers of flints, or coming upon large fissures in the chalk, the water supply is added to.

3512. Has the whole of the boring been in the chalk?—We have passed through the chalk, and through the marl, which is below the chalk, and we are now in the upper green sand.

3513. Do you know what the depth is between the two strata?—No, we have not yet got through the upper green sand, but I do not suppose that it will be of very great thickness; we have just entered it.

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Monday, 30th April 1877.

MEMBERS PRESENT:

Mr. Forsyth.	Sir Andrew Lusk.
Mr. Hardcastle.	Mr. M'Lagan.
Mr. John Stewart Hardy.	Mr. Onslow.
Mr. Hayter.	Sir Henry Peek.
Sir James M'Garel-Hogg.	Mr. Ritchie.
Sir Henry Selwin Ibbetson.	Mr. Stevenson.
Mr. Kinnaird.	Marquis of Tavistock.
Lord Lindsay.	Mr. Young.
Mr. Locke.	

SIR HENRY SELWIN IBBETSON, BART., IN THE CHAIR.

Mr. *Charles Greaves*, called in; and Examined.

Mr. *C. Greaves.*
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3514. *Chairman.*] I BELIEVE you were for many years the principal Resident Engineer of the East London Water Company?—I was appointed their engineer in the year 1851, and have been their engineer ever since. I am now their consulting engineer, which is an arrangement which has been made within the last two years.

3515. Can you give the Committee the extent of the East London Company's district?—I think a map would be the best way of answering that question. (*The Witness exhibited a Plan, and explained it to the Committee.*)

3516. In fact, your district is bounded by the Thames and the New River Company's district, where it impinges upon the metropolis?—Yes.

3517. Whilst the company extends farther on at its eastern end into the country, outside the metropolitan area?—Yes, it extends into the country for a considerable distance.

3518. Is that part which is within the metropolitan area of a high or low level?—The district of the East London Water Company is generally of a moderately low level; it is the most uniform district of any of the company's districts.

3519. Can you give the level above Trinity high-water mark?—The majority of the Tower Hamlets, which constitutes the larger portion of the company's district, is from 30 to 40 feet above high water.

3520. And that ranges, on the average, nearly over the whole district?—That forms a very large proportion of the whole district. I have with me a model which I made a good many years ago, which is a very legible form of showing the general levels of the district (*exhibiting a Model, and explaining the same to the Committee*).

3521. From that model it is shown that there are very few alterations in the level throughout your district in the metropolis?—That is so; there are very few alterations.

3522. Can you give the number of houses which you supply within the metropolitan area?—The number of houses at present supplied by us is a little more than 90,000.

3523. These are supplied by the company?—Those houses are exclusively supplied by the East London Waterworks Company.

3524. Does that include the supplies given by the company for street watering?—Yes, it is the total number of all the supplies, whether they are absolutely domestic or whether they are supplied for trade purposes.

3525. Where does the company derive its supplies from?—The greater part

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of the supply of the company is taken from the River Lea; that was their original source. The company, I may say, was formed in 1807, and they have taken their water from the River Lea exclusively, up to a few years since, when a new source was acquired, and they obtained a power to draw water from the Thames to supplement their supply from the River Lea.

3526. That was at a high point in the Thames?—That was at a high point in the Thames, above any other of the companies; the new main of the company from the River Thames is shown in red upon that model.

3527. You derive your supply from Sunbury through the other districts?—Across the other companies' districts, without any right to supply within those districts; we deliver the water into a reservoir which is common both to our Lea system and to our Thames system.

3528. Do you store the water which you get from the level of the Thames?—We have a very limited amount of storage; it is only since the construction of works for drawing water from the Thames that we have had any storage at all.

3529. Are those reservoirs of any height?—The highest reservoirs which the company have is one constructed within the power of the recent Act, situated on Hornsey Wood Hill, within the limits of Finsbury Park.

3530. At what height does that reservoir stand?—We call that reservoir 140 feet.

3531. And that is the highest point at which water is stored in your district?—That is the highest point, and the only point at which water, after having been lifted, is stored.

3532. Your supply then is entirely from pumping?—Our supply is entirely from pumping, and even from that reservoir it is supplied after having been pumped.

3533. There is no supply by gravitation?—There is none by gravitation.

3534. Mr. Muir stated with regard to the New River Company, that the supply was entirely by gravitation, the reservoir being filled and kept filled by pumping?—There is a little difficulty in making the word "gravitation" clear; all water descends of course under the laws of gravity, but the New River Company have to pump all the water as well as ourselves.

3535. But what I understood Mr. Muir to put before the Committee was, that having the storage of their water at given heights for particular districts, the water flowed from that storage as long as it was full, by gravitation, and that that storage was kept full by pumping, and therefore as long as their pumping kept the stored water full, you got the height given by that reservoir, as your fall for the water supply?—Yes, that is so exactly, and perfectly right, but the system of pumping which is adopted produces exactly the same results as passing through a reservoir would do.

3536. That is what I wished practically to understand; what you would say is, that notwithstanding that the water is not stored in reservoirs which give a fall by gravitation, the pumping is continual, and that consequently there are none of those intermittent intervals which have been suggested as the reason why the supply in the mains would not be sufficient for general use?—That is exactly so; a system of continuous pumping produces precisely the same effect in the result as the supply from a reservoir, but it necessitates a considerable amount of steam power, which steam power must be always in action, and the engines must be ready to relieve and to supplement one another, and to take the place of such as break down or stop.

3537. And that is the condition in which the water is supplied in the East London Water Company's district?—That is the system of pumping in the East London Company's district. A particular portion of the works, technically called a stand-pipe, is erected near the steam engines; that is the measure of the hydrostatic column, and although this pipe may not be more than three or four feet in diameter, the level of water in that column is precisely what it would be if there were a reservoir. If the company had a hill upon which to put a reservoir within their district they would put it there, but having no hill the stand-pipe system has been adopted instead, but it is equally efficient, and entirely precludes any cessation of pressure by means of having a sufficient number of engines ready to take one another's place, and to produce the same result as a reservoir would have given.

3538. Practically

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3538. Practically doing exactly the same as the body of water in a reservoir does at that height?—Precisely the same.

3539. According to this model your district is divided into three different levels, is it not?—The district for the convenience of our own arrangements has been not absolutely divided into three different portions, but is worked as three different levels.

3540. Is that for the purposes of three different pressures?—It is in order to be able to graduate the pressure more conveniently to the houses which receive the supply.

3541. With regard to the lower level, is that composed of poor districts entirely, or are there large manufactories there?—The lower level could not be said to be a poor district, though the character of the houses in the east of London is very much mixed, but the lower level contains a very large portion of manufactories, and all the docks, and receives a very large proportion of our supply; we consider that it may take about one-third of the entire delivery.

3542. Where is your pumping station for that level?—The pumping station for the lower level is at Old Ford.

3543. To what height does the pumping power of the engines force the water?—The water is lifted perpetually to an elevation of 100 feet. The engines are so constructed as to work against the hydrostatic balance of 100 feet.

3544. Are your mains constantly charged?—All mains are constantly charged; in fact, that is the distinction which we have always maintained is the characteristic of a main, that it is a pipe always charged.

3545. Then what presssure would that 100 feet give in your mains?—That would depend on the distance from the point of pumping of the mains to which the remark is intended to apply; but you have it already in the other evidence that the statutory level to which the company is bound to deliver is 40 feet, and it will very readily appear that as the sources of pressure are upon the eastern side of the metropolitan district, and as the heavy deliveries are on the western side, the pressure may be taken to be on a declining level from the source where the pressure is made to the point where it is delivered.

3546. Can you give the greatest variation that there would be?—The pumping engines at Old Ford date their level from near about high-water mark, therefore the pressure would be on a sort of irregular declining inclination from that 100 feet to 40 feet upon the further edge of the district plus, say 30 feet, which may be the height of the ground above Trinity high-water mark, therefore there would be a loss of perhaps 30 feet upon the whole distance.

3547. The minimum amount would be a loss of about 30 feet?—Yes, taking the further part of the district as the point where the pressure would probably drop to its lowest.

3548. Is the middle district worked from the same pumping station?—It is not worked from the same pumping station. It is worked entirely by another set of steam-engines, and an additional set of mains. The station from which the middle district is supplied generally is Lea Bridge.

3549. And what is the level of the stand-pipe which supplies that?—The level to which the water is lifted at Lea Bridge is 20 feet higher than at Old Ford, it is 120 feet, having entirely to itself a complete set of mains, by which the water is brought into London, which eventually mingles, to a certain extent, with the water taken from the lower station.

3550. There is a means of intercommunication between the two districts?—The two districts intercommunicate, and variations have to be made in the extent to which pumping is carried on either at the one or the other, so that the variations either in the day delivery or in the night delivery may be accommodated, without giving at any time any excess of pressure, or without allowing it to fall below what is necessary.

3551. Is the same plan adopted with the higher district?—The northern district is also supplied by steam-engines at Lea Bridge. The steam-engines for that district are regulated to a pressure which lifts the water when required

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to the Hornsey Wood Reservoir, the same reservoir to which the Thames Works lift the water.

3552. That is a higher level?—That is 140 feet.

3553. Have you a pipe communicating with the higher level?—The higher level communicates with the middle level, and the middle level with the lower level; and if the lower level engines and the middle level engines were both to cease working, the water would be allowed to come down from the higher level so as to supply them with water.

3554. And the difference in the pressure of water is not so great as to make it impossible to use the higher level?—It is continually working down; it is continually gravitating by a through system of regulated openings.

3555. Does your Thames supply flow into that reservoir in the higher level?—It is lifted to it because the source from the Thames itself, from which the water is delivered, is not 20 feet above high water; therefore there is the friction of 23 miles of main, plus the elevation of the reservoir.

3556. Is that filtered water, as well as the Lea water supply?—That is all filtered at Sunbury, where that station is situated.

3557. And pumped from Sunbury?—Yes; it is pumped from Sunbury ready to be delivered, and is delivered from the elevated reservoir.

3558. There you have gravitation from that reservoir, from the higher levels?—Yes, it is gravitation.

3559. What is the total amount of pumping power which you have in a day, for instance what amount of water could you raise in the day for your supply?—The supply as delivered now is 26,000,000 or 27,000,000 gallons a day.

3560. For the 24 hours?—Yes, for the 24 hours.

3561. That is over the whole district?—Yes; spread over the whole district for the 24 hours; those quantities are reported week by week in a large sheet which is prepared by Major Bolton, the water examiner, and is published every month for the benefit of all interested.

3562. You do not make any distinction, do you, as between your filtered water and the road water supply?—All the company's water is filtered. We have but one quality for all purposes, clean or dirty, good or bad; they are supplied with one quality.

3563. Can you give the Committee any statement as to how the hourly supply varies throughout the 24 hours?—I think I can give a table which will show that. From 6 a.m. to 7 it is 4·56 per cent.; from 7 to 8, 5·70 per cent., and so on. (*The Witness handed in a Table.*)

3564. That is the per-centage of the delivery of water?—The per-centage of the whole.

3565. That is having given the 26,000,000 gallons daily?—Yes.

3566. What is the largest per-centage at any time during the 24 hours?—Six and-a-quarter per cent.

3567. At what hour is that?—From 9 to 10 a.m.

3568. That is when the general domestic supply is delivered?—The domestic supply is going on all day, and since the company have introduced so large a proportion of constant supply, the domestic supply is going on during a greater number of hours than was the custom during the time when the supply was intermittent; but probably the great increase upon the per-centage at that particular hour is due to the working of manufactories.

3569. Beginning at that time in the forenoon?—Yes, at that time.

3570. Can you state to the Committee what the per-centage of the supply of water is between the hours of eight and nine in the evening?—Two and-a-half per cent.

3571. That is to say, there being 2½ per cent. only drawn at that time for consumption, there is a greater pressure available for other purposes?—We endeavour to keep our pressure uniform as much as possible throughout the day, and we add engine power at various hours and take off engine power at various hours, according to the amount of consumption.

3572. I understand that the company's pressure which they are bound to give is only 40 feet?—The pressure at which the company are bound to raise the water

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water for delivery is 40 feet; that pressure was established as far back as 1852.

3573. And now, with your experience, do you think that that pressure, looking to the character of the district, is a sufficient pressure?—I think it is quite sufficient; there are people who would like to have it higher; there are always a large portion of the public who are always ready to ask for anything.

3574. I understood you to say just now, that you ascertained your pressure by a system of gauges throughout the district?—We have a system of gauges operating in the district, by which we are kept informed of the pressure there is in the pipes; but several years ago, before these refinements in waterworks had been carried as far as they have, our system of being kept informed as to the pressure existing was to appoint a considerable number of the fire-plugs all over the districts to the turncocks in their several walks, and those fire-plugs were started once a week, specially with a view of the turncock measuring the height to which the water jetted from the surface of the street; those were always measured by rule, or nearly estimated, and a return was made by every turncock weekly to the head office of the elevation of the jet of water at all those plugs which were selected for the purpose; afterwards that pressure increased considerably, and the measurement of the height of the jet became rather troublesome, and a great loss of water was incurred; the pressure was much above what it had formerly been, and some gauges were erected by which a continual diagram is drawn, showing the elavation of the water by a pressure machine continuously, night and day.

3575. I suppose the pressure which your consumers require is probably the pressure you maintain throughout the district?—That is what the pressure is gauged at; it is the pressure which the consumers require that we work up to; we do not profess to make any higher pressure, although a continually higher pressure than 40 feet occurs; if the parties obtain a greater pressure than 40 feet we consider that they are welcome to it; we make them no charge for anything above 40 feet, and invariably every day the pressure exceeds 40 feet considerably, and many large factories and hospitals and establishments, where water at a high point is of value, have cisterns where they can receive it at the highest point where they can get it; but 40 feet is the level which binds us in our relationship with the large consumers, who, in the East London district, form a very large proportion of the tenants for water.

3576. That is the pressure which you provide for the fire brigade?—That is the pressure which we offer for the fire brigade, and that is a pressure of which they make, I may say, very little use.

3577. You mean that at present by their system of engines, they only require the water to be delivered flush with the street?—Whatever the pressure is, it appears to be treated as a matter of no interest whatever; there is no estimation whatever for fire purposes put upon the pressure the company have in their pipes. Every drop of water that is put upon a fire is thrown out broad upon the pavement. The first thing is the plug is started, and then the first operation is to stop up the gulley-holes to prevent the water running away, and then to put a dam round the plug, and then to insert the suctions of the fire-engine into this dam and get the water into the fire-engine.

3578. Can you tell the Committee, as was told us by the New River Company, how your district is intersected by mains?—The map which I have handed in shows all the mains of the company; this is a map which was made many years ago for our own convenience, and it is made as clear as possible by omitting all the streets. There are no lines upon this map but our mains, and the river and docks and the canals, those will speak for themselves; this district marked with parallel shade lines distinguishes the district which we have put under a constant supply under the Act of 1871.

3579. In those mains which are marked upon the map you would tell the Committee that the pressure is as you say, if the Metropolitan Board of Works or the fire brigade wished to avail themselves of it?—The pressure is in those mains from hour to hour and from minute to minute; they are always maintained under pressure; they are never empty except for alterations or some attachment of a new branch or something of that sort.

3580. Can you give the amount of those mains in miles through your district?

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district?—The best authority to take that from would be Major Bolton's report, which states week by week the number of miles of all the companies which are under pressure, and which are capable of being used, but I can give still more detailed information if the Committee desire it.

3581. We have ascertained from the other companies the miles of mains which they have, and I wished to know if you could give the number of miles which are constantly charged at this pressure in your district?—On the 1st of January 1875, there were in that part of the East London Company's district, which is within the jurisdiction of the Metropolitan Board of Works, 120 miles of mains and 145 miles of services constantly supplied under pressure.

3582. Upon those 120 miles of mains you can apply hydrants without the necessity of using fire engines?—On all the mains or on the branches from those mains a hydrant might be put, with the full advantage of all the pressure that is in them.

3583. So that you would get the pressure you have described to the Committee throughout that amount of pipeage?—Yes, throughout that amount of mains within the metropolitan district.

3584. Sir Joseph Bazalgette referred in his evidence to your district, I think, and has given the result of certain gaugings which he took; were those taken on those mains which you have described as being constantly charged?—We have no knowledge of where they were taken. The trials and experiments were made entirely without our knowledge, nor have we any means of knowing at all the precise places where the connections were made for the ascertainment of these pressures. It is obvious that they were made somewhere in connection with the mains, but whether in places which would give a fair indication of our pressure or not, I am not able to say.

3585. I suppose many of your mains for street watering purposes are not kept at the same pressure as the others are, or are they all kept at the same pressure?—I do not think I could strictly say all the pipes, but almost all the pipes used for street waterings are connections from the mains.

3586. What was stated by Mr. Muir to the Committee was that those tests of Sir Joseph Bazalgette's had in a few instances been miscalculated, from the fact of their being taken from mains kept for street-watering purposes alone, and not charged as the general mains were?—I took notice of Mr. Muir's evidence on that point, but we have but one set of mains, and therefore we are not liable to that which Mr. Muir described. However, I should say that I do not find much fault with Sir Joseph Bazalgette's experiments.

3587. Therefore you do not differ from Sir Joseph Bazalgette?—I do not differ much from Sir Joseph Bazalgette's experiments; but the pressures that you would get an average from depend a good deal more upon how many were taken in the better parts and how many were taken in the worse parts, than upon the character of the measurements themselves.

3588. I think Sir Joseph Bazalgette gave his pressures in pounds per square inch?—He did.

3589. Could you give them in heights in feet?—We have converted them to heights in feet. I have a table showing his measurements converted into heights in feet, by multiplication by the proper converting figures, namely, 2·31. (*The same was handed in.*)

3590. But this is with regard to other districts besides your own?—This is the whole of Sir Joseph Bazalgette's table converted.

3591. With regard to the whole of the different systems?—Yes.

3592. This gives the height of the ground above ordnance datum and the points where the observations were taken, and the pressure in the pounds, with the height in feet which represents that pressure?—Yes.

3593. Varying from 11·55 to 69·3?—Where the minimum pressure is stated there seems to be a considerable variation, as it goes from 11·55 to 18·85. The pressure would be more reasonably obtained from a consideration of the sources of the delivery.

3594. Sir Joseph Bazalgette, I see, gave a number of results comprising the cases in which the variations took place?—Yes.

3595. Sir Joseph Bazalgette states: "There are two cases in which the pressure varies from 4 lbs. to 9 lbs; three cases in which it varies from 9 lbs. to 13 lbs.;

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13 lbs.; 10 cases in which it varies from 13 lbs. to 17 lbs.; 13 cases in which it varies from 17 lbs. to 22 lbs.; 10 cases in which the pressure varies from 22 lbs. to 26 lbs., and three cases in which the pressure varies from 26 lbs. to 30 lbs."; that you have reduced in this table into feet?—Yes.

3596. It was stated to the Committee, I think, that a pound of pressure represents 2·3 feet pressure?—2·3 feet.

3597. In answer to Question 5597, Sir Joseph Bazalgette gave his test of your constantly charged mains as showing a pressure of "from 18 lbs. to 23 lbs.; from 22 lbs. to 25 lbs.; from 18 lbs. to 22 lbs., and from 20 lbs. to 22 lbs."?—Yes.

3598. He stated that that represents a rise of from 40 to 50 feet?—Of course all these pressures were, it may be presumed, got to show the worst.

3599. But they were taken indiscriminately throughout your district?—Quite indiscriminately. I do not think there was any favour shown; but of course there was no preparation made to get them at the right places. Some of them, I believe, were got by unscrewing pipes in urinals, where, of course, we do not care about keeping a very high pressure.

3600. Those you would represent to be, in some cases, adverse, because they would not represent mains which you say would be looked to in case of fire?—I should say that there must have been a good many of such cases, because I do not see how the connections could be taken on the mains; they may have been taken at points which were not under constant pressure.

3601. Have you plugs upon the mains at present available for fire purposes?—We have not, at present, and have not for many years, put any fire-plugs upon the mains.

3602. Therefore the tests which Sir Joseph Bazalgette used could hardly be applied to your mains, because there are no outlets from them?—There are not; they must have been taken on subordinate branches of mains, which branches might be used for constant supply; but speaking for the company, I think the company are a little bit prejudiced by the evidence, because there are not many of those places where we should care to have a very strong supply.

3603. It does not at all affect the question which you have stated to the Committee just now, that there are in that number of miles of streets which you have stated, mains laid out with constant supply under a pressure which if used might be counted upon?—It does not affect that question at all; those mains are there with all the pressure which we do put into them for the ordinary purposes of the company's supply.

3604. Those were not tested in any way by the experiments which Sir Joseph Bazalgette made?—Not tested justly. I do not say that some of his measurements were not the best, but not knowing where they were taken, I should not like to say anything particular upon that point.

3605. Do you consider that this system of supply which has been adopted by the company is the best which you could suggest for the particular district which you have to supply?—I am not aware that we could improve it.

3606. Not with your present mode of working?—I am not aware that we could improve it; we have means of letting a larger pressure from the middle district into the lower, and we have the means of letting a larger pressure from the upper district into the middle and to the lower, but we find ourselves rather under the necessity of checking the pressure than of increasing it.

3607. That is in consequence of the domestic fittings?—It is for the purpose of keeping the power in hand; it is very necessary for the purpose of a thing of this kind to keep power in hand; if you were to give away all the pressure you had you would find it misused; you would find the public habituated themselves to a pressure which they were not entitled to expect, and we should have to recall them to what was their legal status by shortening the pressure to them, which would produce disorganisation and great inconvenience.

3608. I suppose, for the purpose of pressure, you keep the pressure rather under than over?—Certainly; we regulate the pressure to the requirements; you must understand that a very large portion of the supply of the East London Water Company is given to manufacturers and large consumers; the proportion of water given to those parties is about one-third of the whole company's

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supply; it is not less than 8,000,000 gallons a day, and the factories where the water is used in this way are valuable constructions, full of machinery of various kinds. The construction of those factories has been regulated by the level which the company ordinarily give their water at; sugar refineries, distilleries, breweries, and factories in great numbers, are all constructed upon a methodical arrangement for receiving water at the maximum height at which the company deliver it. The water then gravitates through the factories, and performs the operations of the factories in various ways.

3609. Supposing what has been suggested, that instead of this supply being in the hands of a company, it was in the hands of the municipality, do you believe that any great alteration would be made?—I do not think that any great alteration would be made. Certainly no great alteration could be made, unless it were attended by a very large expense. The municipality might choose to lay independent fire mains all through the City.

3610. That is another question altogether; I mean with regard to the appliances which you have at present, supposing they were in the hands of a municipality, do you think great alterations would be made?—Excepting always that the hydrant service is in a very imperfect condition, I do not see that any great change, or alteration, or improvement could be made in the way in which the water is distributed now.

3611. That is a change which might be made whilst the water was in the hands of a company, as well as in the hands of a municipality?—I think so.

3612. Can you give any account to the Committee of the amount of water which has been used in the last 10 years for fire purposes, as compared with the general supply of the company?—I made a calculation some time ago, and have carried it on year by year of the proportion of our water which we might consider was used and distributed for purposes of fire. In order to get at that quantity I made some experiments upon the delivery of water from a fire plug under a good pressure. Then I took the returns which are made to the company by their own turncocks with respect to every fire, and the length of time which the plugs were out; principally as to the first plug, which is taken as the gauge of the fire, and then going to the additional plugs which are started to give an increased quantity of water, and by computing the time that they were out and multiplying by such a figure as seemed appropriate for delivery per minute, adding something considerable for the quantity of water wasted in the streets, into which the pressure might be thrown at a time when all the cisterns were empty, I obtained a figure which gave me the following proportions:—In the year 1865 there were 310 fires; the total quantity of water used at fires in that year was 20,520,000 gallons; the proportion of the whole supply being ·30 per cent. In 1866 there were 282 fires, and the total quantity of water used was 45,146,000 gallons, and the proportion of the whole supply was ·63 per cent. In 1867 there were 267 fires, and the total quantity of water used was 10,945,000 gallons, showing a proportion to the whole supply of ·15 per cent. In 1868 there were 338 fires, the total quantity of water used being 13,726,000 gallons, the proportion to total supply being ·20 per cent. In 1869 the number of fires was 302; the quantity of water used was 9,344,000 gallons, the proportion to supply being ·13 per cent. In 1870 the number of fires was 371; the total quantity of water used was 24,385,000 gallons, and the per-centage of the whole supply was ·34. In 1871 the number of fires was 354; the total quantity of water used 12,514,000 gallons, and the per-centage of the whole supply ·16. In 1872 the number of fires was 270; the total quantity of water used 12,232,500 gallons, and the per-centage of the whole supply ·16. In 1873 the number of fires was 293; the total quantity of water used 24,862,000 gallons, and the per-centage of the whole supply ·24; and in 1874 the number of fires was 295: the total quantity of water used 17,593,500 gallons, and the per-centage of the whole supply ·16.

3613. You mentioned that you made a certain allowance for waste, I understood you to say?—I did.

3614. Can you say what amount of allowance you made for waste?—I have not those figures by me; those are the results.

3615. What per-centage does that give for the 10 years?—The average for the 10 years is ·247 per cent., which you may say is less than ¼ per cent.

3616. In fact, less than ¼ per cent. of the whole supply was all that was given and

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and taken in the service for fire?—One quarter per cent. was more than was given and used in the service of fire.

3617. Therefore, practically, the company satisfied their domestic supply, namely, 99¾ per cent., and the remaining ¼ per cent., which relates to the fire supply, is all that is under discussion here?—That is all that brings us before this Committee; that, I may say, is a very liberal allowance, and it was made rather with a view to make the most of it than the least of it. I believe if I were to take the quantity of water purely delivered on the fire from our own data, I should not make it more than one-thousandth part of the whole supply, and if I were to take it from figures given by Captain Shaw in some of his reports, it would be a much smaller proportion than that.

3618. You believe that that is rather understating than overstating the case?—It is overstating the quantity.

3619. And understating the grievance?—Yes, certainly.

3620. In the years 1874, 1875, and 1876, can you give the times during which the plugs of the company were drawn at fires?—I will hand in a table to show that which was made upon the principle which I described just now. First, we have the number of fires at which the plugs were not out 30 minutes; then we go from 30 minutes to an hour, and then on by half-hours, until we come to the maximum fire, in the year 1874, when a plug was out for 128 hours, in addition to which there were seven plugs extra, and one stand-pipe.

3621. Is there any particular fire which has been in evidence before this Committee?—I have not in my recollection what fire it was. I think it is very likely that it was the fire at the St. Katherine's Docks. (*The Table was handed in*).

3622. In connection with that, can you give any statement to the Committee with reference to the number of times when the company's turncock was in attendance at a fire before the brigade, or after the brigade in your district?—Of that we have kept a very minute account, because it affects the character of the turncock in the performance of his duty. I produce this statement, headed: "Statement as to the fires in the East London district, showing whether turncock or brigade arrived first." In the year 1868, there were 162 fires, and the average to the turncock's credit is, 11 minutes and 45 seconds.

3623. That is to say, that in the 162 fires the number of hours and minutes at which the turncock was in advance of the fire brigade added together make up that sum?—Yes, in the same year the brigade were first at 59 fires, and to their credit there are 6 minutes and 35 seconds, leaving a considerable balance in favour of the turncock. (*The Table was handed in.*)

3624. May I ask who makes the return in reference to the turncock?—It is mostly made by the turncocks themselves, but the report which they make is countersigned by the brigade, or witnessed.

3625. It is practically a statement corroborated by the brigade?—Yes, it is practically corroborated by the brigade, or witnessed either by some person belonging to the house in which the fire occurred, or by some competent witness.

3626. Practically, it is a statement which can be relied upon?—Certainly, we work upon it, and we treat the performance and the energy of the turncock according to it.

3627. Will you state the last year or two?—In the year 1874, the turncock was first at 74 fires, and the brigade was first at 90, so that the brigade had been making up their duty considerably; the turncock being credited with 8 minutes 12 seconds, and the brigade with 5 minutes 34 seconds; so that in point of time the turncock was still the better, but not as much as in the earlier years. The number of times are in favour of the brigade, but the hours and minutes are in favour of the turncock.

3628–9. Does the advantage still go on improving to the brigade?—It continues about the same.

3630. The Committee wish to know the number of times in which there has been, from the turncock not being present, a difficulty in getting water; that is really what is important at a fire?—That I think the Committee must get from other witnesses.

3631. Does not your statement show a number of times in which the fire brigade has been in advance of the turncock, which would imply the number of

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times in which there was a difficulty, until the turncock came, in getting a proper supply of water?—It would be a matter of minutes no doubt; there is a race to get to the fire, and there is a race to start the plug.

3632. That points to the advantage of being able to get the water without a turncock, and instead of waiting for a proper full supply, by his assistance, to get at it at once?—Quite so; but the Committee have had abundant evidence to show that there is nothing to favour the means by which a turncock can get to his plug; he is a man living in his own house, independently of all officials, and he hears casually of a fire and runs as fast as he can to get to it; there is half-a-crown dependent on it, and that is one of the conditions, perhaps, which operates in rendering him as expeditious as possible.

3633. Can you state what the East London Company has done with regard to the furnishing of a constant supply in their district?—The East London Company have progressively carried on the extension of constant supply in more ways than one for many years. They commenced tentatively soon after 1852, in allowing constant supply to be put on where people desired it. Some years after that they began to favour constant supply more obviously and determinedly, and since the Act of Parliament giving them the power to put on constant supply compulsorily, namely, the Act of 1871, they have very largely added to the extent of the district which is under constant supply. The map which I have handed in shows the district which has been compulsorily put under constant supply.

3634. Have you any record of the number of houses you had placed under constant supply before the Act of 1871?—We have calculated the number to be 35,000.

3635. That was before the Act of 1871 gave you additional powers?—That was before the Act of 1871 gave us additional powers; or, in fact, before it provided any one with compulsory powers.

3636. How did you then regulate the supply to the houses; how did you get over the difficulty of the waste which has always been said to be so much against constant supply?—We tried to regulate the fittings as much as possible, but not having that complete control which was required, the pressure was restricted by inserting into the pipe a small disc, with a regulated aperture, the magnitude of that aperture being such as would give an ordinary house a fair quantity of water within the limits of the day, but would not allow the escape of more than a certain quantity at all.

3637. Whilst giving a constant supply, you only gave that constant supply which you thought each individual house required?—Rather more. I should say four times what a house would require. We did not pinch them down to their bare needs, but gave them four or five times their proper requirements.

3638. By that contrivance you got over the difficulty which has been always suggested in laying down the system of constant supply to a whole district, namely, the enormous waste of water?—We got over not only the difficulty of the enormous waste, but also without putting people to the expense of revising their fittings, or of inserting the new fittings which under any other system would have been necessary.

3639. This restriction upon constant supply did not affect your mains or the services from which your consumers were supplied?—No, not in the least. The restriction was put into the lead pipe after the water had left the company's pipes altogether.

3640. In 1867, I think the East London Company made an application to Parliament, did they not?—In the year 1867 the East London Company applied to Parliament for power under two Acts of Parliament. One was to construct large works in the valley of the Lea for the improvement of their Lea supply, and the other was to take a supply from the Thames at Sunbury, and to lay a pipe from their proposed works at Sunbury into London.

3641. Those Bills were referred to a Select Committee, were they not?—Those Bills were referred to a Select Committee, and that Committee had also submitted to it the duty of considering the general water supply of London.

3642. Was the Metropolitan Board of Works heard before that Committee?—It was.

3643. Did

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3643. Did the consideration of this supply of water for fire purposes come under their purview?—The consideration of the water supply for fire was deliberated by that Committee, and forms a very important section of their report.

3644. Mr. Bateman, I think, was called before that Committee?—Mr. Bateman was called before that Committee and gave evidence.

3645. And Captain Shaw also?—Yes, and Captain Shaw also.

3646. Do you remember what was the bearing of the evidence of those witnesses brought forward by the Metropolitan Board of Works?—The bearing of the evidence both of Mr. Bateman and Captain Shaw himself was very much against the whole system of fire-plug delivery and supply.

3647. If I remember rightly, Mr. Bateman stated that the plug system was a barbarous system?—He stated that it was a barbarous system, antiquated, out of date, and rude in the extreme.

3648. The Report of that Committee was very strongly in favour of an alteration of the existing system, was it not?—The Report of the Committee was so strong that one really wonders that it has not before now had a stronger effect.

3649. Now, with regard to the plug, what was the ground of complaint made against it by those witnesses?—The complaint against the plugs may be summed up in saying that they are slow in their operation; that they require the attendance of a turncock; that all the pressure which is in the main is thrown away; that without the attendance of the turncock the brigade are at a loss to act, or unable to make use of the apparatus which is there for them.

3650. And did the Metropolitan Board of Works act upon that suggestion?—Nothing has been done, and nothing has come out of the recommendation of the Committee.

3651. The Metropolitan Board of Works have been, I suppose, restrained by the idea that the change would be one of great magnitude in respect of expense?—The Metropolitan Board of Works have given two reasons; the first one is that hydrants are no better than fire-plugs, and that no advantage will be gained by the use of hydrants; and another is that hydrants would be a vast source of expense.

3652. Before that time, that is to say before 1871, the company had very many miles of mains and service pipes also under constant supply and pressure?—A very large number; the company have not added very much to their mains since 1871.

3653. Then at that time, and subsequently, the new appliances which were recommended by that Committee might have been applied generally to those mains?—Undoubtedly those appliances might have been introduced and would have saved the expenditure of a larger sum of money; because as the mains are being laid it is cheaper to put those things in, than to cut out and put them in afterwards.

3654. A correspondence, I think, took place between the East London Water Company and the Metropolitan Board of Works, after the Committee of 1871, with regard to that?—There was, and letters have passed from one to the other which perhaps the Committee will allow me to put in as part of my evidence. (*The Witness handed in a book of correspondence.*)

3655. Those are letters which have been already referred to at the time when the officers of the Metropolitan Board of Works were under examination?—They were; we thought it our duty to urge upon the Metropolitan Board of Works views similar to those which had been expressed by Mr. Ayrton's Committee.

3656. Can you give the Committee the dates of the letters, and the terms in which the company urged upon the Metropolitan Board of Works that the recommendations of that Committee should be adopted, and that instead of the plugs which had been condemned by that Committee, hydrants should be used?—The company addressed a letter to the Metropolitan Board of Works on the 17th of December 1872, of which they had an acknowledgment on the 18th December 1872.

3657. That letter recapitulated the whole story, and gave the state of things before 1865, and in that they point out that nothing has been done by the Metropolitan Board of Works between that and 1871?—That was so; between that time and the date of the writing of the letter.

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3658. Did not the company urge in that letter the placing of hydrants upon their mains rather than upon the services?—That was the primary object of the correspondence.

3659. They stated in that letter that 150 miles were available for hydrants?—They did.

3660. They also stated that if the service pipes were used a very large addition might be made?—Yes, by adding the service pipes, which had then become practically mains, though we have never lost the expression "service pipes"; that letter was acknowledged by the Board on the 18th December 1872; the company then wrote again on the 31st December 1873.

3661. And there you recapitulated again what had been done by the company?—We did; this letter was written under the name of the secretary to the company, and described the intention of the company to proceed with the system of constant supply by blocks.

3662. And the company also gave the results of their experience, did they not, with regard to the cost of applying this principle to the domestic supply?—The letter of 1873 rather announced the company's first commencing to carry out the system of constant supply by means of blocks; it gave their experience of the first block.

3663. From that experience it was stated what the expenditure per house had been, to enable the owner or occupier to remedy what was amiss in the houses which had not adopted that system?—Yes.

3664. Did that letter produce any action on the part of the Metropolitan Board of Works?—Not at all. We have had no action on the part of the Metropolitan Board of Works in the matter; that is the grievance which we feel.

3665. But then the company received a letter in 1874, did they not, from the Metropolitan Board of Works?—The company were answered upon the 24th December 1874.

3666. The company's letter having been written in December 1873?—Yes; the letter which the Board wrote in 1874 was a circular which was sent to all the water companies containing the question: "Whether some plan could not be adopted of turning the water into the various mains at certain fixed hours of the day, and of making the fire brigade acquainted with the hours fixed for each part of the district, so that on reaching a fire the brigade might know at once where to go for water." That implied a misunderstanding of the conditions under which the mains were kept charged and the water ready, because as the mains were always kept charged night and day, there was no turning the water on for the supply of particular mains; the mains were always charged.

3667. That was the answer of your company?—The company answered upon that, with further suggestions.

3668. In 1873 a larger number of houses had also been brought under the operation of constant supply, had they not?—The company gave the necessary notice to the Metropolitan Board of Works for the bringing of the second and third parts of our district under constant supply.

3669. There was no action taken upon that?—There was no action taken by the Metropolitan Board of Works with regard to these notices.

3670. Were they ever considered by the Metropolitan Board of Works?—We had reason to think that they had never been considered, but, of course, we had no private knowledge.

3671. That letter was acknowledged by the Board in 1875, I think?—In January 1875, a letter was written by the Board in acknowledgment.

3672. Then in October 1874 the company gave notice of another block?—Of bringing a fourth block of houses under a system of constant supply, and they acted upon such notice in March, April, and June 1875.

3673. In February 1876 the company did receive a letter from the Metropolitan Board of Works in answer to their letter of January 1875?—Yes, they did; and in that letter they said, among other things, that the Metropolitan Board of Works had caused a house-to-house inquiry in the East London district as to the company's alterations, "to ascertain whether the supply afforded was sufficient; what inconvenience the occupiers of the houses were put to in altering the fittings; what was the expense of the alterations, and many other particulars."

3674. Why

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3674. Why I wished to refer to this letter was, that in this letter the doubts of the Metropolitan Board of Works with regard to the use of hydrants were freely expressed?—They were.

3675. I think the words used were that they had "grave doubts whether the new system," that is, the system of hydrants, "might not possibly in the end fail to supersede the costly but very efficient establishment at present existing." The Board then went on to say, "The Board as the authority charged by the Legislature with the extinction of fires in the metropolis, has felt it to be its duty to urge the importance of a constant supply of water at high pressure for the extinguishing of fires, and has from time to time directed the attention of the companies to the delay which has occurred in obtaining water at fires, as the Board is convinced that if the existing mains and services were constantly and continuously charged, the fire brigade would, without the use of hydrants, be able to obtain a sufficient supply of water for extinguishing fires." Those words are, I think, in their communication?—Those are in the reply of the Board.

3676. Now I suppose you really represent that the constant supply, as suggested, does already exist, and that in your opinion the hydrants would be efficient auxiliaries, at least to the engines, if placed upon the mains?—My own opinion is, that it is a great defect in London that hydrants have not been put down universally. I would put them upon the services as well as upon the mains, but the mains have the argument especially in their favour.

3677. Do you agree with that part of the same letter in which the Board say, "The figures placed before the Board lead it to this conclusion, and the Board's engineer distinctly advises with reference to the use of hydrants for the purpose of extinguishing fires, that they would not be of real practical advantage to the Board unless a sufficient pressure of water were insured, and that this cannot be the case so long as the management of the water supply is under the independent control of different companies?"—That is a view which we do not coincide with at all.

3678. But you believe that under the existing water companies' management, the system of hydrants might be applied to the existing pressure?—I have not the slightest doubt about it; the system of hydrants is adopted where property is not under the charge of the Metropolitan Board of Works, within the district of the Metropolitan Board of Works.

3679. In answer to this letter, did your company offer to co-operate with the Metropolitan Board of Works?—They did offer, and have offered continually, to do anything that was within the limits of their powers to co-operate with the Board in making their water more available for the extinction of fires.

3680. Your company pointed out in their reply also, did they not, the extent to which, before 1871, you had brought your system under constant supply, and the extent to which, up to 1876, you had brought it subsequently to 1871?—The company, in their letter of 13th April 1876, recapitulated the statistics.

3681. In that letter there was a statement made that 25,000 houses had been placed under constant supply since 1872, which, added to the 35,000 previously under constant supply, made a total of 60,000 brought under constant supply up to 1876?—Yes.

3682. And that there were 70 miles of mains under constant supply, and 70 miles of service?—Yes, the facts were stated as fully as it was possible to get them into figures, for the information of the Metropolitan Board of Works; the report of Major Bolton, the water examiner, is referred to.

3683. That pointed to the fact that a number of hydrants for private purposes had already been placed in different manufactories, and for street-watering purposes, and for Government establishments?—Yes.

3684. And that a total of 2,622 hydrants had been placed all over London?—Two thousand six hundred and twenty-two hydrants had been put down at private cost; the number now put down by the East London Company for those purposes is, roughly, about 500.

3685. And that letter acknowledging the letter of the Metropolitan Board of Works, and pointing out your reasons for differing was not answered at all, was it?—The company received no answer to it.

3686. Now I suppose the company propose, notwithstanding that, to continue the system they have begun of bringing the different sections steadily under constant supply throughout their district?—That is what is now being done. I

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have here a map upon a larger scale than the one you first inspected, which shows the several blocks; all those blocks have been successfully placed under constant supply, and the whole is gradually being so brought in (*explaining on the Plan*). There are throughout the whole of this outer district already a large number of houses in which constant supply has been laid on gradually since the constant supply was first undertaken by the company, which are not made to appear upon that map, because it would confuse the map, but they are mingled among the intermittent supplies.

3687. Mr. *Ritchie*.] What do you mean by constant supply; does that mean high pressure?—It means the company's pressure of 40 feet.

3688. *Chairman*.] That the mains and the services too are constantly charged with a pressure of 40 feet under your Act?—It does not necessarily imply that there is 40 feet of pressure in every house, because it is not required in every house, as, for example, where there is not a part of a house, even the chimney pots, above 25 feet, but the service is constant.

3689. The company are gradually intending to bring the whole of their district in sections under a system of constant supply?—The company are proceeding section by section, and I should think five years would about complete it.

3690. At present, about what quantity in the metropolis in proportion to the whole of your house supply is under constant supply?—The proportion of domestic service now under constant supply of the metropolis is about two-thirds of the whole service.

3691. I understood you to say just now that you thought in about five years or less the whole of the district would be put under the same system?—Unless any fresh experience hostile to the proceeding arises, we shall probably complete it in five years or a little more.

3692. You do not imply that very little had been done since 1871; in fact, since 1871, as I understand your answer to the former question, there have been 28,000 houses brought under a system of constant supply?—You are quite right; we have done it by transferring the houses to a very great extent since 1871. The progress that we made before was, I say, rather in the way of anticipating the future and requiring that all new houses as they were successively built should be fitted with the constant supply fittings, whereby we have saved all owners of houses the expense of alterations.

3693. What you mean is that in each of those blocks following one after the other you make the houses take the constant supply?—We do, we make them alter the fittings for constant supply.

3694. And gradually you hope in five years to have brought the whole of the district supplied by your company by the same means under constant supply?—Precisely so.

3695. I think you stated you had as many as 120 miles of mains and 145 miles of service pipes at present supplied with constant pressure?—I think I gave you that figure.

3696. Can you state what number of miles of service pipes are now on the intermittent system?—I think the corresponding figure to the table left 145 miles of services within London at the same time in the districts still remaining to be changed.

3697. And those are the miles of service which you think the company will, in five years, be able to bring under constant supply, as they have the rest of the district?—That is so.

3698. Hydrants might be now applied, might they not, to the whole of the 120 plus the 145 miles which you have described as being constantly charged?—They might.

3699. Those fully charged mains are not confined to any particular district, but spread generally through the whole of your area?—The constant supply mains permeate the whole district and extend to the very furthest verge of it.

3700. I think you stated, also, that on those mains, amounting to 120 miles, there are no, or very few, fire plugs?—There are a few fire plugs on the old mains, but it is very many years since we carried on the practice of putting fire plugs on mains.

3701. Is that because you believe the fire plugs, as was stated by Mr. Muir, would

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would be blown out by the pressure of water?—Fire plugs on mains are altogether dangerous things; they are blown out not only by the pressure, but they are blown out when they freeze. We have had damages to pay on many occasions by the bursting of a plug out of a main.

3702. You do not agree with the evidence given, that a very large number of fire plugs exist upon mains, and are serviceable?—There are a considerable number existing in some of our districts, but when one is stating a principle, one says there are none. I believe there are 500 plugs actually upon the East London Company's mains, but some are driven in never to be moved, though they exist, and some are never started at all.

3703. Sir Joseph Bazalgette, in answer to Question 5657, when asked, "Are you not aware that fire plugs cannot be placed upon constantly charged mains?" said, "But they exist upon them to a large extent." Then he was asked, "I thought that evidence had been very strongly given, not only before this Committee, but before all Committees which have already sat upon these questions, to the effect that fire plugs upon constantly charged mains could not exist on account of the pressure"? to which he replied, "With the present pressure they do exist, and the same pressure is exerted upon the services as exists upon the mains. It is much more trying to a plug to be placed upon an intermittent system, with the same pressure, than upon the constant supply system," and he goes on to give the reason for that?—There is an inconvenience with regard to fire plugs on mains, in addition to what has been mentioned here, that is to say, in addition to the spontaneous inclination to blow out, there is a difficulty in getting them in again; it is impossible to drive a fire plug into a main with any pressure in it without shutting down the main, and shutting down the main is objectionable on all grounds.

3704. That leads, I suppose, to a great waste of water?—It leads to an interruption of the supplies to factories, and other places, which may be dependant upon a permanent and perpetual issue of water.

3705. All your service pipes of course have fire-plugs upon them?—Throughout.

3706. What number of fire-plugs do you generally send out in a year?—Fire-plug pipes are of course sent out to the outer districts. I think the number may be reckoned up in the company's district beyond the metropolis as well as in the metropolis itself. I have had a memorandum prepared ready for the Committee in case the honourable Members might ask for it; it is a very considerable number, being in all for 16 years plug pipes, 5,210, and plugs, 41,128. I have had brought here a three-inch and a four-inch plug with its corresponding pipe.

3707. Those are used in your services?—Yes, they are used in our services, and are of three and four inches internal diameter.

3708. When those services are brought under constant supply, do those plugs remain still upon the pipes?—We have not ventured to remove them, because if a plug were removed there would be no means of delivering a fire service at all.

3709. Having the fire-plugs upon constantly supplied service pipes, do you find that they blow out?—Not altogether, but it is an objectionable instrument.

3710. Supposing hydrants were applied to the mains, would you suggest that they should be applied also to the service pipes so as to do away with the possibility of that objection?—I am prepared to recommend that the use of hydrants should be universal.

3711. That is to say, universal where a constant supply was given?—I would put them everywhere, even where the supply was intermittent; I would not put down a fire-plug to-morrow if it were not a question of money; a hydrant is a better thing than a fire-plug under any conditions whatever.

3712. Mr. Muir stated that whilst he suggested the placing of hydrants upon the mains of the New River Company, he thought that wherever the service pipes had hydrants placed upon them they should be service pipes made to connect with the mains distinct from the domestic supply?—I did not gather that from Mr. Muir's evidence; if he said so I cannot agree with him.

3713. What I understood Mr. Muir to say was, that he wished to keep the domestic supply distinct from the constantly charged supply which would be

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available in case of fire, and that whilst the intermittent supply went on for domestic purposes he would propose to utilise all the mains, and where mains did not exist he would carry branches, or supply pipes, which could be used as mains on which the hydrants could be placed for fire purposes, but that he would not have them placed upon the intermittent service for domestic purposes?—I think that the opinion would require a certain amount of qualifying, because, admitting, as I say, that fire-plugs ought not to be continued and hydrants put down, if there were no mains in the street, what would the street do unless you converted a fire-plug into a hydrant.

3714. What I understood was that a branch should be laid down as it was in the City, which should be the connection for fire purposes with the main, and that in order to use that for domestic purposes it should be then separated for an intermittent supply?—That may do very well for the City, where the mains are more numerous than they require for such purposes.

3715. In that part the constant supply is not attempted; but as it has been carried out in your district, the constant supply might be placed upon the service pipes as well as on the mains?—Quite so. I look forward to constant supply being universal, but of this Mr. Muir is not quite so sanguine.

3716. That makes the whole difference; for when the domestic supply is on the intermittent system it might be necessary to check the service pipe after your hydrant was placed upon it, and thus reduce the pressure?—I cannot see that is any argument against the universal use of hydrants. My impression is that wherever a fire-plug is wanted the hydrant should take the place of it.

3717. Looking at it from the point of expense, supposing the system of placing hydrants universally through the intermittent and constantly charged systems together were rejected on the ground of expense, it might be possible to avail ourselves at a less cost very efficiently for the purpose of the public service, of hydrants placed upon constantly charged mains?—Quite so; there they are more available and will be more efficient, and there they should be first put; but I have not the slightest doubt whoever had the doing of it would very soon see that it was advisable to extend it to the services. I can mention an instance in the town of Birmingham where fire-plugs were originally their general means for getting water out of the pipes for the purpose of fire extinction, and in that case the engineer has converted this "boss" (*exhibiting a portion of a service pipe*) which stands up in the street into a hydrant, by having the hydrant fittings made with a small casting, and he fixes them over that "boss" with an ordinary joint made with cement. The aperture then becomes the place where the movable stand-pipe is attached; the expense of that is very small; it is not attended with any expense in the way of cutting open the pipe. I have here also a ball hydrant (*producing the same and explaining it to the Committee*); the hydrant is portable; it may go to any chosen number of the fixed article. You may have one of these portable hydrants for 50 of the boxes, or any proportion you like.

3718. Do you mean that by applying that box as it were to the service pipe or the main, you could make one of your hydrants carried by the brigade available for any number of those boxes?—That is the way in which it is done in all towns where the ball hydrant is used for getting water out of the main; one of these portable hydrants is supplied for 50 of the boxes; the fixing is done in a moment.

3719. I suppose the box is covered over?—A covering is put in the street just as a covering is put over a plug. I would say that to avoid the expense of cutting out this entirely they have a new casting made such as this, which could be attached; and the engineer at Birmingham has made special castings, the lower part of which fits on to the top of the pipe, and the upper part is fitted with the hooks, and by making a rough joint a hydrant is introduced at once with a very small expense, which would be infinitely less than the cost of digging and cutting them out. I mention that as a cheap way of transforming the plug apparatus into a hydrant apparatus.

3720. Can you give at all an estimate of what the transformation of the plug system into a hydrant system like that would be, according to the Birmingham plan?—I cannot.

3721. Are you aware that has been carried out through Birmingham?—It has been carried out through Birmingham to convert the fire-plug cups into hydrants.

3722. Is

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3722. Is that the ball hydrant to which Mr. Rawlinson took exception?—I think it is; it is called Bateman and Moore's system.

3723. Is it the one of which he said he would not put down any more from his experience of their working?—I do not recollect that; they are of a very common kind; they are very largely used.

3724. Mr. *Forsyth.*] How long have they been in use in Birmingham?—I should think three or four years; it may be more. I have also here another hydrant which is complete in itself. The ordinary turncock's key is applied to the square and then you get the water. In that case each hydrant is complete in itself, barring the hose and the nozzle.

3725. *Chairman.*] What is the name of that hydrant?—They call it the loose valve hydrant. I have described it for your purposes as a fixed hydrant, as distinct from the ball or moveable hydrant, which is another form.

3726. What is the price of that?—I have the price from the maker; this last one is 38 *s.* 3 *d.*

3727. But that is one which of course would necessitate a good deal of work in attaching it to the existing system of pipes?—It would; there must be something brought up with a flange on which this flange must be bolted; a branch must be got in some way from the main.

3728. There we should come into the expense which has been started, not only the breaking up of the street, but the applying of the hydrant to the pipe, which would raise the price of the original hydrant itself very considerably?—It would; that is a more expensive way of acting.

3729. That you do not represent to be the case in dealing with the system which has been adopted in Birmingham?—Where it is possible to retain a hydrant in the middle of a street, where it is not objectionable on account of the traffic, the Birmingham plan answers very well indeed.

3730. Where an objection does exist, they would have to go to the expense of a branch to avoid the expense of fixing it in the roadway?—It will be necessary to attach a branch and carry it a certain distance to the kerb, and finish it with a terminal joint to it; to do that you would have to cut.

3731. What you suggest is, that it might be possible to avail themselves of the ball hydrant to be placed in the centre of the roadway, but that the loose valve will be a better form of hydrant, in case you have to fix it along by the kerb?—I think that would be the best form of hydrant in the City and where the streets are much thronged, and where a better class of hydrant can be afforded.

3732. Would there not be this difficulty of having a different system of hydrants throughout the town, that the brigade would not be always aware of the instrument they had to use?—I think these things might be so arranged that the brigade should be quite sufficiently and readily aware of the apparatus. I do not think it would be absolutely necessary to have every article within the whole of the metropolis on one identical pattern.

3733. As long as the brigade had the key which would give them the power of utilising this form of hydrant, and the upright to work the ball hydrant, that would be all that would be required?—I think so; the brigade are intelligent men; they must not be treated as if they were incompetent to do anything.

3734. What I was referring to was the answer given by Sir Joseph Bazalgette, in answer to Question 5698; he says, "Mr. Bramwell, who will come afterwards, has seen them. I can say that at Manchester the ball hydrant costs 2 *l.* 10 *s.*, and the Liverpool sluice hydrant costs 6 *l.* Mr. Taylor, the engineer of the Lambeth Company, objects to the ball hydrant, and Mr. Rawlinson says that he has put down a number of ball hydrants, but would never put down another; if anything gets between the ball and the pipe, and prevents it from closing, there is a good deal of leakage from it. And then again Mr. Rawlinson urges that, although it is a cheaper hydrant to put down, if anything goes wrong with it you cannot get at it without turning off the water"; do you think that those are objections which might be fatal?—Not at all fatal.

3735. You do not think they might be fatal to using them in cases where, from the traffic in a thoroughfare, they could not be in the middle of a roadway?—I should think that the facts of these great towns are better information than any opinion which an individual can give.

3736. I think you stated what the cost of the loose valve hydrant was by itself,

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itself, but I do not think you have stated what the cost of the ball hydrant is?—With regard to the cost of Messrs. Bateman and Moore's hydrant, the lower cast-iron part only is 8 *s.* 6 *d.* Then it requires the street-case and cover, the cost of which again is 8 *s.* 6 *d.* Then the portable part constructed mostly of brass; the stand-pipe with a single outlet is given to me as 54 *s.* 5 *d.*

3737. What is the actual cost of each individual outlet for watering the streets; you are carrying about one instrument which may be applicable to a considerable number of boxes, and I want to get the cost of the instrument and of the cover, which prevents it from being choked with dirt, so that the men could utilise it when they came to place the nozzle to it?—Seventeen shillings is the cost of each without the stand-pipe.

3738. Seventeen shillings is the cost of this without the fixing?—Yes, without the fixing. Then the cost of the moveable article, which is applicable for a limited number with one outlet, is 54 *s.* 5 *d.*, and with two outlets, 68 *s.*

3739. Therefore 3 *l.* 8 *s.* is the maximum cost of each individual upright?—£. 3 8 *s.* is the cost of each individual upright, with a coupling for two hoses.

3740. And that of course would be available for a very considerable number of those fixed points?—It would be available in this way, that if one man were appointed to attend to any limited number of hydrants, he would have one in his possession to take with him.

3741. Would it not rather be this, that each of the engines would be supplied with a number of hydrants that they would carry with them?—It might be so, but we would rather look to supersede engines by the application of this principle.

3742. That rather points to a difficulty with regard to the ball hydrant, because you would want a very large number of uprights; the police on duty must have one?—There would be stations at various intervals all over the town; that is the way in which it is arranged; there is a sort of watch-box in which these things are kept under the supervision of the police and of certain firemen.

3743. But notwithstanding that a number of people would have to use them, and that it would be necessary to have them placed about the town and with the engines, the reduction in cost would be very large, because they might be available for a number of those street-fixed instruments at the same time?—I think the use of the ball hydrant is economical. I think it would diminish the cost of putting out fire all over the town.

3744. Have you calculated what the cost of putting hydrants would be all over your district, including taking up and fixing?—It is not at all an easy thing to make a mental average; the hydrants would be of all prices, from 50 *s.* to 10 *l.* 10 *s.*

3745. You mean the hydrant itself?—The hydrant itself and the fixing, and if you take that at every shilling, which I suppose you might do in some instances, it would give you 161 cases, and the average of them would be 6 *l.* 10 *s.*; and I think I could undertake to hydrant all the East London district at 6 *l.* 10 *s.*, and would be very happy to do it.

3746. You believe you could hydrant the whole of the metropolitan district supplied by the East London Water Company at 6 *l.* 10 *s.*?—Yes, I think so.

3747. Including the whole, breaking the pavement and the fixing?—I think so. Of course you will see very quickly that it depends upon the proportion of the number at one price and another, not upon the average of the prices of the article. The number of the cheaper sort and the number of the dearer sort would be very much affected by the number which you put in the outer districts; in the outer districts the expense of putting them down would be far less than where the traffic is large and the pavement is expensive, and there are tramways perhaps over the street.

3748. Of course all these matters enter very largely into the question of expense?—Very largely; we have had to pay 10 *s.* a foot for breaking up pavements.

3749. But you think that, taking the whole of your district, it might be done at that cost?—Yes.

3750. And that would be done by placing them, as you have suggested, where it was possible in the middle of a roadway, and where it was not so possible, bringing

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bringing them by connecting pipes to the kerb?—I am sure 10 *l.* would cover the expense any way, but I should say under the estimate of 6 *l.* 10 *s.* that I assume I am doing it with as close a view to economy as possible.

3751. Then you would avail yourself of every opportunity, where it was equally serviceable, of the cheaper form of hydrant?—Yes.

3752. I wish distinctly to understand; you mean that with that average of 6 *l.* 10 *s.* you would calculate upon using a certain number of ball hydrants fixed in the middle of the roadways, which would be cheaper, because the stand pipe, the upright part of it would be available for more than one of the boxes?—Precisely so; I mean that the moveable apparatus would bring your expense lower; the fitting of the hydrant over the existing cup of the fire plug would bring your expense lower, and the non-insertion of the branches and the non-breaking up of the traffic in the street, would also make your expense lower.

3753. That makes you think that you could do it for 6 *l.* 10 *s.*?—Yes.

3754. But supposing the other system to be adopted, placing it at the kerb, which was the more expensive for fixing, it could not be done for that?—No, not for double that.

3755. You are of opinion that the ball cock, where it could be so applied, would be equally useful for the fire brigade?—I have endeavoured to get the information from practical men who have had the doing of it, and that is the result of the opinion I have got from them.

3756. Supposing this constant supply, and a system of hydrants laid down, to be adopted, are the pipes which you have laid throughout your district capable of bearing that pressure?—Yes, the company's pipes are.

3757. When you first took over the company there were some old-fashioned pipes in parts of the districts?—The lead pipes belonging to the consumers may be weak, but the company's pipes are all strong enough, and I am not aware that there are any of them defective.

3758. When you took the company over first, was not a good deal of your district piped with wooden pipes?—Not very much of it. With regard to the East London Waterworks Company, established in 1807, I believe it may be said to their credit they never laid down a wooden pipe, but a boring mill was established, and a boring bed was fixed for boring the elm trees which might be required to be used. It appears that some were used in the way of repair, because some mains were all wood, but the company never laid down of their own motion any wooden pipes whatever.

3759. I believe you have the whole of your district so piped that constant supply might be applied to the pipes of the company now?—Yes; and I say within five years, we shall have probably the whole thing done, whether anything results from the deliberations of your Committee or not.

3760. If a system of hydrants were placed on all the mains and all the service pipes that were constantly charged, you could do away to a great extent with the difficulty which has arisen from the non-attendance of the turncocks?—Yes, we should not only do away with the difficulty, but we should probably do away with the fires too; every large fire is at one time a little one, and the only thing you have to do is to have your water brought to bear upon the fire at the first possible moment.

3761. What you represent is, that you would by your hydrants practically extinguish fires before they got to any head?—Quite so. I think it would be only great negligence, or deliberate malice, which produced a fire after that.

3762. Of course that contemplates that whoever has the command of the fire brigade, there should be appliances under the command of the police, which could be used within the first few minutes?—Yes, quite so; there must be something in the nature of a watchbox, where the things could be kept ready.

3763. At what distance apart would you contemplate the fixing of hydrants throughout the area?—I would agree with the evidence which has been given, namely, 180 feet, as fixed in the City, or about the distance at which we now fix fire-plugs.

3764. Have you estimated at all the number of hydrants which at that distance would be required to cover your area?—No, I have not.

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3765. This question of hydrants which the Metropolitan Board of Works has not taken up has been taken up, I believe, by a good many private companies and individuals throughout the metropolis, has it not?—Yes, throughout properties which have valuable buildings and stores within the East London district, the use of hydrants is, I may say, universal; all the docks are provided with hydrants, and all valuable manufactories are also provided with hydrants.

3766. Have you had any experience, or has the company had any experience of the results produced from using these hydrants in case of a fire breaking out?—I will take you to an extreme case. There are men in our district who cannot get insured; they do not wish to burn, and they put up hydrants; they carry on dangerous trades and manufactures, and some of these people have got hydrants so placed in their factories and their men instructed in the use of them, that they boast how many seconds it takes them to turn the water on.

3767. Sir *Henry Peek.*] May I ask what trades these are?—I would refer to the case of one man who is a brushmaker; he makes brushes out of cocoa-nut fibre. He has a machine called a "devil," which tears the fibre to pieces, and knocks the dust out of it, and renders it in a condition fit to be used for brushes. He has had continual fires, and cannot get insured.

3768. *Chairman.*] Is that since he has availed himself of the hydrant system?—I can hardly say; perhaps he has, but he has increased the number of hydrants so as to have that dangerous material under command.

3769. Have his premises ever been destroyed by fire?—I have seen his place burning.

3770. And burnt?—Very considerably.

3771. Notwithstanding the hydrants?—Notwithstanding the hydrants. I know another factory which has a business of very much the same kind, which is the tearing of oakum; there the dust which is raised by the process fills the whole chamber, and it is so inflammable that the light of a candle would set the room off with an explosion, and the consequence of that is that apparatus against fire is put about the whole place; he had either no insurance, or great difficulty in getting an insurance, and he established hydrants right in the place, and if there was any alarm one man had to run to the door and turn the cock, and there was water.

3772. Mr. *Forsyth.*] Has he had a fire?—He had fires.

3773. *Chairman.*] In consequence of the establishment of those hydrants, have the insurance companies made any reduction in their premiums?—That is a matter of detail to which I could not speak.

3774. Independently of these very combustible trades, you have in your district a good many docks and other companies which have availed themselves of hydrants upon your existing pressure of the mains, in the belief that they would protect themselves against fire?—Yes, the number which has been referred to by Major Bolton is 500. I have a Table here of 438, and among them I have put down the Victoria Docks, North Woolwich, 36 hydrants; the St. Katharine Docks, Upper East Smithfield, 10; the Stepney Union, 4, &c., &c.

3775. I suppose the docks keep their own fire-engines?—Yes, they do.

3776. Ready to use the water from the hydrants?—They have their own fire-engines, but they have their hydrants round the docks ranged around the outer walls, and the hose is kept in a cupboard, and a certain man is told off from the superintending office to have charge of it, and the moment he hears an alarm of fire away he runs, opens the hose, and screws it on.

3777. Have any arrangements been made to ascertain the utility of these matters?—They turn their men out frequently to practise them.

3778. Without the company knowing anything about it?—It is entirely under their own control; but I may say that all this water is entirely commanded by meter, so that we do not object to their using it.

3779. At the same time the supply of water for fire purposes is, under your Act, without charge?—It is without charge.

3780. Of course if they did not believe they had sufficient supply to justify them in thinking that, if a fire arose, they would be able to control it, they would not remain satisfied with the system they had adopted?—No; they have gone

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gone to a considerable expense in the size of the mains they have laid down within their own walls for the ready bringing of their water to bear upon a fire.

3781. Have they laid down mains larger than the ordinary mains which you have in your district?—They have laid them as large, because they have laid up to our mains.

3782. Your attention, I think, has been called to the idea of the different district companies being amalgamated, on the grounds both of economy and that they would be more practically useful if amalgamated; do you consider that is so?—The question has been several times talked of, and has received a good deal of my attention, and the attention of all persons connected with the company.

3783. Do you believe that greater power could be got, and greater economy arrived at?—I cannot see that any great advantage is going to be derived from any process of amalgamation, either financially or through the amalgamation of the works.

3784. You state that in view of the size of the area which would have to be worked?—If they were all under one management for general water purposes it would be a very large concern indeed. The companies, at least five out of the eight companies, are quite large enough already.

3785. You mean in respect of the area of supply?—Yes, in respect of the area of supply.

3786. Of course practically there would be some advantage, because you would do away with some of the boards of management?—You would, but at the same time you would incur other expenses. Boards of management derive very much of their duty from the way in which the water rates are now levied. Board of directors have now to sit as courts of appeal, to listen to objectors who think they are too highly rated. If a different system of rating were adopted those courts of appeal would cease to be needed.

3787. As long as the present system of rating goes on you think they would be required to perform that duty?—I think the board would require as many sub-divisions under its head as there are water companies now doing the sub-divisional work on their own bottom.

3788. Another question has been raised with regard to the possibility of getting a greater amount of pressure by uniting the different companies together. Do you think that would be advantageous or possible. For instance, you would get, as has been pointed out, the higher pressure which has been said to exist in the New River Company, which it is said would be available under those circumstances in the East London district?—It would end in your having to increase your quantity of water at the high levels to make it available at the lower levels. Our own experience in the east of London has been rather in favour of sub-division than of amalgamation. As I explained to the Committee in the beginning of my evidence, it was a voluntary matter, under our own ideas to divide the districts into three sections, by which we prevent the pressure on the upper portions from coming down upon the lower level, and therefore the experience within ourselves is against the amalgamation of pressures.

3789. Your experience is derived from the domestic supply, but taking it from the point of view that you want to get a certain amount of jet for the purpose of a fire, I suppose you would increase your power in that direction by getting the advantage of the higher pressure?—It would lead to very great difficulty if the pressure were wasted; if unnecessary pressure were thrown upon the lower mains for the purpose of the extinction of a fire, we should disorganise our system very much. In order to do it effectually, it would be necessary to contemplate the laying down great quantities of independent mains solely for the purpose of fire. I will admit that if you had an independent system of fire mains, it would be advisable then to connect those mains with the higher reservoirs.

3790. But if what Mr. Easton's father suggested to a Committee some years ago were adopted, that is to say, a distinct supply for fires alone, it would be an advantage to have the highest levels you could get, would it not?—Quite so; the whole thing would be changed under that system.

3791. Would you not apply that high pressure to your mains if you kept, as was suggested the other day, the domestic supply distinct from the mains, and

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laid down additional service branches, as is proposed to be done in the New River district?—We could not do that. I do not think it could be worked anywhere.

3792. What, of course, the Committee are anxious to arrive at is, the greatest amount of available pressure for fire purposes in the existing mains, or large pipes of the companies, if it could be done, and it seems almost reasonable to suppose that if you can get into those constantly charged mains a pressure from the highest point available, you do render your hydrants even more useful than you contemplate with the present system?—There is no question that the greater the pressure the more efficient the hydrants would be, and it would be desirable to get the greatest available workable pressure into them.

3793. Sir Joseph Bazalgette stated that a pressure of from 50 to 55 lbs., which would represent over 100 feet, is what would be required throughout the town to make hydrants useful?—I think the attempt to carry out any such system in London would fail; the service of water to houses in London is larger than in probably any towns which there are instances of in the country.

3794. It is because of this connection between the domestic supply and the fire supply that the difficulty arises?—No doubt; if you had no domestic supply at all, the use of water for the extinction of fires could be well managed and a higher pressure maintained unquestionably.

3795. You do not think you could so separate your domestic supply from the mains in your district, so as to be able to avail yourselves of the higher pressure of the mains where the fire hydrants were placed, without interfering with the domestic supply and the service pipes on which those hydrants were not fixed?—It could not be done without expending vast sums of money for adding mains for fire purposes.

3796. But you do represent that placing hydrants upon mains as at present charged would give, though not the pressure which Sir Joseph Bazalgette suggests, but still an immense additional pressure, and in the putting out of fires an immense advantage to the brigade?—There is not the least doubt about it; time is of the essence of the question.

3797. I think you wished to refer to a statement of Mr. Chadwick's before this Committee, in which Mr. Chadwick said that the Chairman of the East London Company had told Captain Tyler that the inspection of houses for the prevention of waste was impossible to be carried out?—He made that remark, but it appears to me to be impossible, because a systematic survey of a very extensive nature was being carried on; at the only time we had the pleasure of seeing Captain Tyler in the East London district.

3798. That inspection has been maintained constantly?—The inspection of the district was carried on first of all in rather a desultory manner. Our men visited, but it was not made incumbent upon them to bring back reports of what they saw; they left notices, as it were independently, that repairs were required, and that system was not very satisfactory. In the year 1861, I established a new office within the works. I put a very efficient person into it as superintendent. We had a thorough index made of the whole of the company's district in London, and then appointed a systematic body of surveyors, who not only examined the houses, but brought back reports of the condition of the houses, as to all their fittings, and that has been continued periodically every year since.

3799. Have any objections been taken to those visitations?—Scarcely in any cases. We have had a few parties here and there who objected. Of course, some parties will always be found to object to anything.

3800. But, as a rule, you have had no objections?—As a rule our visits of inspection now amount to 250,000 in the year.

3801. Mr. *Forsyth.*] Have you power to do that under an Act of Parliament?—Yes, the Act of 1871 gave us full powers, though we had power before that.

3802. *Chairman.*] Your attention has been called to some evidence given by Captain Shaw. Do you wish to refer to that with regard to the requirements which Captain Shaw says are necessary for the purposes of a fire; I think it was 2,100 gallons a minute which he said would be required?—It is a very fine supply, and if Captain Shaw had it, no doubt he would be very happy; but I think he can only have stated that as a sort of saving answer to the general question,

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question, that he would like to have it. It is not to be imagined that it is a quantity which could be given in any general way; it is quite beyond the power of the companies. We cannot imagine that any fire in London is going to require a 15th or 16th part of the whole of that which the East London Company delivers; it would require to be a volcano that you were going to extinguish almost.

3803. In the East London district, Captain Shaw would not find those requirements met?—He would not, and I do not think he would find it anywhere.

3804. It is not one which could be easily met in any district?—It is not to be met; at least I do not see how it is to be met.

3805. There was some mention made with regard to the marking of the existing fire-plugs; I believe that the Metropolitan Board of Works have discontinued that practice?—They have discontinued it; in fact, I cannot say that the Metropolitan Board of Works ever performed it.

3806. I suppose it would be an advantage in facilitating the working of the brigade to have the position of the fire-plugs marked, would it not?—Very much so; it is a defect now that there is no marking carried on. The old marks which the companies put up years ago have become decayed and fallen down, and the companies cannot undertake all these matters voluntarily, when there is every reason to assume that they are the duties of a particular body at present.

3807. I think Captain Shaw also stated in his answer to the Question 1564, that a pressure equal to 300 feet would be required for the general use of London; have you considered that statement?—Those requirements of Captain Shaw I will not say are preposterous, but are certainly over-grand.

3808. I presume that what you would say is that any pressure, such as 300 feet, must form a distinct pressure, apart from the domestic supply?—It must; if such a pressure as 300 feet were required or were to be given, you must have a separate and an independent set of mains, reservoirs, engines, and everything for it.

3809. It is not with a view of superseding the work of the brigade with their engines but rather of supplementing it, that you suggest your system of hydrants?—I am afraid that I must say that you would be superseding it to a great extent.

3810. Do you wish to supersede the use of engines generally throughout your district by hydrants, and do you believe that if you did so supersede them, a 40-feet pressure would be sufficient to throw a jet of water from a hydrant over a building in your part of the town?—No, I could not say that, because in fact we have a pressure of more than 40 feet, although 40 feet is our legal limit, but there are many places in which a continuous business is going on at 50 feet.

3811. But before doing away with the engines, you ought to be able to show that you have a pressure in every part of your district which would meet the highest requirements which could be made upon you?—I have not said, nor do I hold the opinion, that it is advisable to do away entirely with engines, but I think the calls for engines would be far fewer.

3812. I understood you just now to state that your real wish, by the suggestion you made, was to supersede engines by hydrants; what I wished to ask was whether you thought that, with the existing pressure, that was possible, and whether you thought the placing of hydrants was not rather an addition to the use of engines, as supplementing them very largely, and possibly on many occasions doing away with their use, but not doing away with them generally?—Precisely so, putting the proceedings in the sequence in which alone it would be possible for them to take place. The erection now of hydrants would be in addition to the engines. I am not proposing doing away with the engines as an authoritative action, but practically the throwing of water from hydrants would, to a great extent, supersede them, and the more it superseded them the better.

3813. But whilst the pressure of water might very often be applied without the use of engines, as long as your present pressure remains you could not do away with the possible necessity of engines?—Not at all. I do not think it would be advisable to do away with engines at all.

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3814. I suppose, if you got this extreme requirement of 300 feet, you might get to that state of things which they have in the northern towns, where they have superseded engines?—Probably; yet in Manchester they still retain their engines. There are many properties in back streets and factory yards where hydrants could hardly be expected to exist, and into those places I think a fire-engine hose would be carried. I suppose that is the way in which they are used in Manchester.

3815. In fact, when you stated that which the Committee understood to be your wish, that engines should be superseded; it was not with the view of superseding them absolutely, but with the view of very often superseding them at fires?—Precisely, as I think in many cases the fire would be subdued, or partly subdued, before the engine came.

3816. Now, I wish to ask you about the reduction of the pressure. Have you considered the evidence which has been given before the Committee about the reduction of the pressure which would be produced by the application of a length of hose?—I must beg to differ from a good deal of what has been said as to the loss of efficiency by the length of hose; certainly by the use of 200 feet.

3817. It has been stated in evidence to the Committee that 200 feet of hose applied to a pressure about equal to or a little below what you say you can give, would practically reduce the jet almost to nothing?—I think Sir Joseph Bazalgette hazarded that opinion, but I do not think he can get it from practical knowledge.

3818. Mr. *Forsyth.*] Have you practical knowledge of this question?—It is continually before my mind. I am not present at many fires, certainly; but one knows the operation of the water at a fire. I think there must have been some qualifying idea in Sir Joseph's mind at the time he said that, because we know perfectly well that if you stand in front of a hose of 200 feet long, even with the fire-plugs as they are, and with the experience which we have, even Sir Joseph Bazalgette's evidence would be dissolved.

3819. *Chairman.*] It was stated, in answer to Question 5609, "A hose of 200 feet in length would exhaust the greater part of the pressure without throwing the water to any height, merely in passing that quantity through the hose," that is at your pressure; you do not agree with that?—I do not agree with that. At the present time fires are occurring continually. The engine comes down with a great clatter, and brass helmets and a good deal of glory, and the fire is subdued; the engines wish to go away, and they bring a copper thing which they call a "dummy" and drive it into the plug-hole: it fits into it, and they put the hose to the top, and the fire plug is for the time converted into a hydrant; the water continues to be thrown upon the fire. The fire brigade go home, and then all the glory being reaped by the fire brigade, the water companies are left to keep the fire from breaking out again; that goes through 100 or 200, or 300 feet of hose; that is done every day in London.

3820. Mr. *Forsyth.*] To extinguish the embers?—Yes.

3821. *Chairman.*] Do you get a sufficient jet in that way?—Yes, and that is through a reduced orifice, because the "dummy" has not the advantage of the opening which would be given by the proper hydrant; it is a way of extemporising a hydrant.

3822. That is not a hose of any length?—Of unknown length.

3823. I suppose there is this to be said, that in those cases they do not want to throw a jet any height; it is more the direct flow that they require?—Possibly, but I suppose in some cases otherwise, though I should not suppose there is any exact rule to be laid down, it may be when they arrive that the house is burnt out, and there is nothing left to burn; it may be left to play upon the accumulated mass of burnt wood.

3824. You know that the water has to rise in the hose a certain height, but yet still the probability is that the delivery is into the burnt out remains below?—It will be various in its power.

3825. Now as a summing up of the whole of this evidence, you believe that by an application of hydrants great facilities will be given?—Very great indeed.

3826. And you think that the expense which undoubtedly would be laid upon the town in applying hydrants generally throughout, would be justified by the results?—Certainly; every fire which happens would pay for several hydrants.

3827. And

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3827. And that the economy in extinction of fire would, before long, justify the outlay which must be incurred when first establishing the system?—I think so.

3828. Is there any other point which you would like to place before the Committee?—I do not know that there is.

3829. Mr. *Forsyth.*] You stated that Captain Shaw's suggestion of a supply of 2,000 gallons a minute for extinguishing fire was practically impossible; will you tell the Committee what is the amount of gallons that you could supply per minute in case of a fire, taking the normal state of your pressure?—I have not got the information in figures so that I could express it.

3830. You say that 2,000 gallons a minute is impracticable?—It is impracticable really.

3831. You do not appear to know the maximum which you could supply?—No; we have never had any experiments made or any means of measuring the quantity supplied at any fire.

3832. There are eight companies which supply London now?—There are.

3833. I suppose there is no communication between any of the mains or any of the pipes of the different companies, one with the other?—There is no communication between the mains of the East London Company and their only neighbour, the New River Company; but there is a communication, as I have been informed, between the New River Company and the West Middlesex Company. I am further told it has been there for 50 years and has never been used.

3834. That is shut off, but they might communicate?—It stands shut.

3835. Would it, in your opinion, be of advantage that there should be means of possible communication between the different mains of all the companies, so that if there were any chance of a deficiency of one company, in case of a great conflagration, it might be met with the supply of another company?—I think it is a theoretical benefit. I do not think it would practically arise.

3836. Supposing the pecuniary question could be adjusted satisfactorily, and all the interests of the different shareholders could be taken care of, do you see any advantage or not in there being what I may call a large water trust for the whole of London, instead of the different companies existing as they do now?—I do not think that there would be any great advantage, but it is rather after the fashion of modern movements to do so.

3837. Are there any streets in London where there are the mains of two different companies, or is every street in London appropriated to one company separate from the others?—It is both ways; the border streets in some instances have mains of two companies.

3838. By border streets you mean the streets bordering between two companies?—Yes; supposing the New River Company supply one side of the Haymarket and the West Middlesex supply the other side of the Haymarket, there would probably be two mains in that street.

3839. Therefore those streets would be better off in case of fire than other streets, because they would have two sets of mains instead of one?—Quite so: there are some streets in the Borough where the mains are promiscuously mixed, so of course they must have the mains of each company.

38340. Mr. *Hayter.*] I think you stated that the ball-cock hydrant is used throughout the streets of Birmingham?—I think it is used throughout the streets of Birmingham so far as they have converted them. I cannot say that they have converted them wholly, but I have it from the engineer that that was the system that was being carried out, and I think that I gathered that it was to be done throughout.

3841. Will you explain what is the difficulty from the traffic of putting them down in the roadway?—The difficulty arising from the traffic is from the manipulating of the thing after it is down, not in the act of putting it down. For instance, take Broad-street in the City; suppose you had a hydrant in the middle of the street, and you had a hose from the middle of the street, you would have to stop all the traffic, because of course carts and carriages cannot drive over the hose.

3842. *Chairman.*] Is not one of the difficulties in placing a hydrant over a very large traffic that the pressure of the roadway. and the disturbance of the roadway, is so great that you get injury done to your hydrant?—No, I do not think

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think that you get injury to the hydrant itself, because it is covered by a box My point as to the difficulty was as to the manipulation after the thing was down on the main.

3843. In case of a fire the police stop the traffic, and therefore you could have the space clear?—Yes; but in a street of great traffic it is desirable that the hydrants should be at the side, and I believe Mr. Haywood's practice is to lay the hydrants at the side in all cases.

3844. Mr. *Hayter*.] Have you seen Mr. Haywood since he gave evidence here?—No.

3845. You are not aware now that his opinion entirely coincides with yours with reference to the very little loss you have in the amount of jet from passing through the hose?—I am not aware of that.

3846. Could you tell me who you think the expense should fall upon, if these hydrants were placed throughout the metropolis?—It should fall upon the whole of London. The Board of Works ought to be authorised to raise half a million for this purpose, and to levy it in the form of a rate.

3847. Would you put the rate upon your district or upon the metropolitan district?—Upon the metropolitan rates. I should think it is an expense which would be recouped in the lapse of less than 100 years, in the preservation of such an immense body of property from burning.

3848. Have you any suggestion to make with regard to an improvement in the means of communicating with the turncocks?—The only improvement which has been suggested, and which one could ever have urged, would have been having messengers at the brigade stations to send to the turncock, but beyond that I do not see how anything is to be done, but the question in our East London Company is being rather superseded by the prevalence of a constant supply which does away with the turncock: the turncock's office is becoming defunct; when the whole of the town is under the system of constant supply what will the turncock have to do; he will be a man of another character kept at the company's expense to watch their interests in a different way, to be the recipient of a message in case of anything occurring with regard to the pressure or supply, but with regard to turncocking there will be no more turncocking to do; we find that is so in our district, which is under constant supply; we have there diminished the number of turncocks, and therefore this question is a very vital one; it is very opportune to mention it now because this Committee is sitting upon the question, and that is our view of the question, as stated in our correspondence with the Metropolitan Board of Works; we have shown them that the office of turncock is becoming defunct. We have inquired what are to be the arrangements when they are no longer required for the company's uses; the question is easily solved if the hydrants are put down, because then they will be marked, and lettered, and numbered, and when there is a fire they will look out for the number and go to the hydrant marked; all we shall care is that it is not left playing or running an inordinate time.

3849. I think you state that you see no difficulty in teaching the fire-brigade men everything connected with the use of a hydrant?—The fireman is taken from the same class of men as the turncock; he is taken from the company's service. They are not permanent; we have to move them, and if they die we must appoint new ones.

3850. You see no advantage in their living at a fire-brigade station?—No; I think a messenger would do all that was wanted.

3851. Sir *James M'Garel-Hogg*.] Do the pressures shown in Sir Joseph Bazalgette's list generally fairly represent the pressure you find in your district?—Not unfairly.

3852. Then if they are not unfair or incorrect, you cannot have a uniform pressure of 40 feet throughout your district?—Certainly not; there are many places where the pressure vanishes where there is no object in maintaining it; the butts are low, the water runs away, and the pressure is only according to what is required.

3853. Then if the pressure throughout your district is not of a uniform character, what will be the good of putting hydrants upon it?—There would be very little good there, or the advantage would not be nearly so great in putting down hydrants as there would be under the improvements that would take place simultaneously with the placing of hydrants.

3854. But

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3854. But if your pressure is not 40 feet, will you tell me how you think the Metropolitan Board of Works would be justified in placing hydrants where there was not sufficient pressure to enable them to make use of the water in a proper way?—If the pressure was appreciated we should be very glad to apply more pressure.

3855. That does not answer my question; if there is not sufficient pressure to use a hydrant at a fire, what is the good of putting it there?—It is not much good at those places where there is not that pressure.

3856. Have you got any map to show the pressures in those different districts which are under the East London Waterworks Company?—The map I handed in gave the pressure at the sources and at the delivery, but you cannot indicate the varying pressure.

3857. You told the Honourable Chairman in referring to the correspondence, that the Metropolitan Board of Works had said that the hydrants were of no good; will you kindly point out any part of the correspondence where anything of that sort is stated?—In the letter of the Board of February 1876: "The figures placed before the Board lead it to this conclusion, and the Board's engineer distinctly advises, with reference to the use of hydrants for the purpose of extinguishing fires, that they would not be of real practical advantage to the Board unless sufficient pressure of water were insured, and that this cannot be the case so long as the management of the water supply is under the independent control of different companies."

3858. That being the case, I suppose you would allow it was hardly fair to say that the Metropolitan Board of Works stated that hydrants were of no use?—I think that is just the inference.

3859. You have just told me now that you would not put a hydrant where there was not constant and proper pressure?—But in a vast question with regard to the metropolis, you must not take the existing state of things as governing what one would do.

3860. I am taking the large and extended view and not the small view; do you think that it is fair to say that the Metropolitan Board of Works stated that hydrants were of no use, when they simply stated that hydrants would not be of use unless a sufficient pressure were ensured?—It does not say unless a sufficient pressure were ensured everywhere.

3861. But I must ask you to answer the question; do you object to answer the question?—Not in the least. Our inference from Sir Joseph Bazalgette's explanation is, that the Board says at present that the erection of hydrants is of no use.

3862. You say that without any qualifying circumstances?—I can hardly imagine that Sir Joseph Bazalgette is not perfectly aware that they would be of use somewhere, but that is the way in which he chooses to put his view, and the Metropolitan Board of Works have adopted that, and we quote it.

3863. Now look at page 32, paragraph 2: "The information obtained by the members of this sub-committee, and the experiments they witnessed, conclusively showed the value and efficiency of hydrants for extinguishing fires where there is a constant supply of water under really high pressure." Now do you mean to assert to this Committee that you understood the Metropolitan Board of Works to say that hydrants were of no use?—In London at present.

3864. Without a constant supply under high pressure; did we say that, or did we not?—It is not so categorically stated as that of course; it may be taken with a reservation.

3865. Are those words before your eyes?—Those words are here, "unless a sufficient pressure of water were ensured."

3866. Turning to my question, there is not a constant pressure of 40 feet all through your district, therefore the Metropolitan Board of Works could not be expected, as you say, to put hydrants in places where there was not constant pressure?—On places where the pressure was less than 40 feet.

3867. When you speak of a jet thrown 100 feet high, can you tell the amount of pressure, the quantity of water delivered, and the length of hose in that case?—No, I am not able to say; I have never seen a jet thrown 100 feet.

3868. I suppose you would grant that those points would govern the height?—They would very much, but many more things would also govern it.

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3869. I gather from your answer that you have not made any experiments whatever?—I have not.

3870. You stated just now that Sir Joseph Bazalgette's opinion with regard to the amount that the jet was reduced from friction, you thought could not have been given from practical knowledge; I just deduce from your answer to my question that you have not made experiments yourself?—On jets of 100 feet I have not.

3871. On jets of any feet?—I have made experiments.

3872. Will you state definitely the result of your experiments?—I do not think I could state anything.

3873. You stated that Sir Joseph Bazalgette "hazarded" such a statement as that; was not it rather hazardous for you to say that your experience would enable you to dissolve his evidence; will you help me to dissolve Sir Joseph Bazalgette's evidence?—Yes; if you will meet me in Whitechapel I will hold the hose, and Sir Joseph shall stand in front with his evidence.

3874. Are you aware that the evidence which he has given before this Committee is the result of his practical experiments, and that he is prepared to prove every word he has said?—Experiments take a great deal of trying, and long digestion, before you can apply them as grounds for any general rule.

3875. Then supposing those experiments had been made over a period of days, or weeks, by competent people, and you saw and heard the results of them, would you be prepared to alter your opinion?—I do not think I should.

3876. Not if you saw it proved contrary to what you have stated?—I do not think it is proveable. I think my opinion is right.

3877. You place that against the practical experience of others who are competent to judge, having made practical experiments upon the matter?—I do not think their experiments could have been precisely to the point.

3878. And you would not be prepared to change your opinion if you had the evidence placed before you?—That is a problematical view, which is hardly a fair argument. If you wish to be so precise in your question, I must have the precise point upon which I gave my opinion again placed before me.

3879. You stated that Sir Joseph Bazalgette could not have spoken from practical knowledge; I tell you that he has spoken from practical knowledge, and I ask you whether you would modify your opinion when the result of those experiments were placed before you in a practical form?—I have made a great many experiments, and Sir Joseph Bazalgette has made a great many experiments. He may deduce certain results from his experiments, and I may deduce certain things from my experiments, and the experiments may be all correct, but it is a very difficult thing to make deductions with regard to the laws relating to fluids.

3880. You would not modify your views if certain proofs were placed before you?—Certainly I should. I should be a very poor engineer, and very unfit to hold my position if I would not.

3881. So you may change your views?—But I think it is rather the other way.

3882. Now, with regard to the cost of the hydrant. I think you gave the price of one you were advocating as 3 *l.* 5 *s.*; how did you arrive at that cost?—I gave the prices from tradesmen who are prepared to supply them.

3883. Are you aware that the City have undertaken to lay down hydrants?—Yes.

3884. They have gone a great deal higher, have they not?—Yes.

3885. Which would be the best, the City hydrant or the one you propose to lay down?—I do not know the pattern of the City hydrant; a hydrant may be almost any price you like.

3886. If hydrants were put in as adjuncts to the use of engines I presume you would say they should be of good quality?—Yes, I should not at all propose to carry out the job cheaply or inefficiently.

3887. And you think they might put a fire out without getting an engine up at all?—Quite so; that would be the point to aim at. I should endeavour to do so.

3888. I think you stated that if hydrants had to be placed upon the sides of the

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the streets; that would add materially even to the cost of the cheap one that you have brought before us?—No doubt it would.

3889. I think you stated that it would double it?—I forget what was the particular priced one under my observation at the time, but I should say it would be double; the cost of laying pipes across a street is very great; there may be gas and telegraph, and half a dozen other things which may be already in the street, which may drive you deep and require you to put in crooked pipes till you got to the kerb.

3890. How many miles have you got laid down in your district under constant supply?—One hundred and twenty miles of mains, and 145 of services.

3891. And how many yards would you place them apart?—I defer to those who have charge of the matter. I would take the distances at which they are laid down in the City.

3892. Have you calculated what the cost would be beyond what you have told the Committee?—No.

3893. You think the Board of Works should be authorised to raise speedily half a million for the purpose of placing hydrants in the metropolitan area?—Yes.

3894. Do you give the docks, where they have hydrants, any extra pressure?—No, we have no means of giving extra pressure; we do not distribute pressure in any local way.

3895. In answer to a question you stated that you thought hydrants would do away with fires; now, is that the case in Manchester, Liverpool, and other towns where they have a constant supply?—I think fire as a question of fatality has very much diminished, but of course the commencing of fires has not very much lessened.

3896. You have no figures to show that?—That must be taken on the common sense understanding of such a thing, that if the water is ready at hand a fire is confined to a couple of bed curtains, or some pieces of paper, or something on the ground floor in the shop; if the water is immediately at hand, that is the magnitude to which the fire reaches.

3897. You gave the Committee some information about the turncocks being late or early as compared with the fire brigade. Was the information under Captain Shaw's report?—No; it was quite private.

3898. Is that a return which you think Captain Shaw would endorse?—No; it is our own statement. I do not wish to go beyond the fact that those returns are made by our own turncocks, supervised by our foremen, and overlooked afterwards by the district superintendent; they come into the head office as statements of the affair at any particular fire.

3899. *Chairman.*] Do you compare them afterwards with the statements published by Captain Shaw with reference to the number of fires, and the occasions on which the turncock did not come, or how do you get the verification which you stated?—We do not get a verification as to the hours and minutes; we get a certain amount of verification as to the general effect of fires.

3900. Sir *James M'Garel-Hogg.*] In fact it is a return taken from the statements of your own officers?—Entirely.

3901. Do you think the conditions of the water supply are as favourable in your district as in Manchester and Liverpool?—The pressure we will say does not compare, but the volume of water is probably larger; the readiness is greater, and the magnitude of the pipes larger. I think we are better piped than Manchester a good deal.

3902. The pressure is not so good, is it?—No; in Manchester you have hydrants on the mains, and therefore you have a great advantage.

3903. In placing constant supply at the command of a district, have you not any complaints from the inhabitants as regards the constant visits of your superintendents?—Nothing of any moment.

3904. Have you got any list to show the number of houses in a certain district, the number of houses visited, and the various opinions elicited from the inhabitants thereof as to the fittings and constant supply?—No, we never asked for their opinions; we have to take it in hand to do it compulsorily, and their opinions are of no value.

3905. You know that a great many of them do not approve of it?—As a general rule most people approve of it.

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3906. Some people complain of the *espionage* of your men, do they not?—They complain of their making their stair-carpets dirty, if they have any, or bringing dirt on to the steps. Some people have a great dislike to anybody coming into their houses; we have had long orations about the "Englishman's house being his castle," and all that sort of thing.

3907. *Chairman.*] The Act of 1871 gives you abundant power, does it not?—Abundant power; we have never had to take a man before a magistrate for refusing us entry.

3908. Sir *James M'Garel-Hogg.*] Generally speaking you think that hydrants ought to be placed upon the mains, but you do not know the cost they would be placed at?—I have gone into the matter in a general way, but I have not gone into details in this matter.

3909. Mr. *Stewart Hardy.*] I want to understand clearly why there is any more difficulty in putting a hydrant in the centre of a road than there is in putting an ordinary fire-plug there; an ordinary fire-plug, I suppose, is on the pipes in the centre of the road?—It is on the pipes within the road, wherever the pipe happens to be.

3910. The same would be the case with the hydrant, I suppose?—Precisely.

3911. Why should a hydrant be any more injury to the traffic than an ordinary fire-plug is?—It is not that a hydrant will be more injury; it is that the using of water out of a hydrant would be a little more interference with the traffic in the street than where the water is left to gush out from a fire-plug, and caught in a dam.

3912. But surely when a fire-plug supplies the water for a fire, the traffic is stopped during the time of the fire?—I do not know that in all cases it is so.

3913. At all events, the stoppage of traffic during a fire is a very small evil?—Quite so.

3914. And you would be able to shut the hydrant as quickly as you could replace the plug?—Certainly.

3915. And you do not think the hydrant itself would be liable to injury from being in the roadway?—I do not think that the hydrant would be liable to injury, assuming that it is adequately covered.

3916. But the covering would not be so much larger than that of the plug as to interfere with the traffic in any way, would it?—I think the covering of a hydrant would be always somewhat larger than the covering of a fire-plug. There are boxes in some parts of the City 9 or 10 inches square which the wheels continually jar over.

3917. Sir *Henry Peek*] If I understand you rightly, it would be a very great disadvantage to have fixed stands in the middle of a street; they would be like posts in the middle of a street, would they not?—No; when we speak of hydrants in that sense, we assume that it would be something covered by a box. It would be a little box set flush with the roadway.

3918. But many of the hydrants now are fixed posts, are they not?—That is the fashion which is adopted in some towns, that the post is built up in the kerb, and that the screw nozzle is taken off horizontally from the upper part of it.

3919. It is perfectly clear there would be no such objection to a post on the kerb, as there would be to a post in the middle of the roadway?—That could not be thought of for a moment; it is not easy to fix a name to those different articles, but there are in many places those implements which you referred to, which are used for the purpose of drawing water from the water-carts. It is at the option of the surveyors whether they will put them up for filling water-carts, or whether they will have a box level with the kerb, and bring the water up from the box with a hose.

3920. If I understand it aright the pressure given by the East London Company is less than the pressure given by any of the companies?—The statutory pressure is less. In 1852, when the question was under the consideration of the Committee, we argued very strongly in favour of a uniform elevation of 40 feet, because it was something which everybody understood; 40 feet from the pavement in front of a man's house is a height which is amenable to any man's understanding; whereas Trinity high-water mark and 300 feet all require the assistance of a surveyor to explain, and if there is any dispute between the consumers of water and the company, it requires an elaborate amount of evidence to

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to prove whether the company are failing in or doing their duty; but 40 feet from the pavement of any street in London is a matter which may be roughly ascertained by anybody; it is quite an easy thing to count the courses of bricks; bricks generally run four bricks to a foot, and anybody can know at once what the height is.

3921. It appears to me that the district which is covered by the East London Water Company requires a higher pressure than most, because you take care of the docks, the sugar refineries, and the Mint, the wool warehouses and the large public warehouses of every kind and sort, and yet you have a lower pressure of water than any one of the eight companies?—We have; but we have a larger delivery to large consumers.

3922. That is of water, but we are here not with regard to the supply of water to consumers, but for the purpose of considering the supply of water for putting out fire; and if there were a large fire in the top floor of the docks you would not be able to reach it?—I suppose there are many places that we cannot reach.

3923. But still we have it in evidence that the other companies would reach heights of from 80 to 100 feet?—They are not under the same obligations and duties that we are with regard to large consumers. You must recollect that one-third of the water of the East London Water Company is given for manufacturing purposes.

3924. But we are not here for the purpose of inquiring into a manufacturing supply, but with respect to what means there are for putting out fires; for instance, you know a fire will as often occur in a top storey as in a bottom one?—Quite so; but the honourable Chairman has elicited already that all the pressure we have or ever intend to have at command is that pressure which we keep and maintain for the benefit of the public at large as consumers. I do not think that you will find that fires are more severe or get to a head quicker in the East London district than elsewhere.

3925. What struck me was this: in looking at what Captain Shaw states he requires, and how you would meet his requirements, I find that to throw a jet 50 feet high with an 1⅛ inch nozzle will require a pressure from 50 lbs. to 55 lbs.; that pressure appears not to be had in the district of the East London Waterworks Company. Then Mr. Bramwell says: "I am perfectly prepared to say to the Committee, that in my opinion it would be a waste of money to put hydrants upon mains in which no greater pressure than that was to be maintained;" I suppose you agree with him?—No, I do not agree with him, because my opinion is that if the pressure were half that a hydrant would still be available and useful.

3926. You showed the Committee a portable hydrant; is that a hydrant likely to get out of order; is it a complex instrument?—Not particularly; there are thousands of them in use.

3927. You made use of a curious remark; you said you had granted factories the privilege of having a hydrant; does your company look upon the fact of putting a hydrant in a private house or in a private dock as a privilege?—Yes, certainly.

3928. You make them pay for it, do you not?—Only for the quantity of water that they use.

3929. Do you mean to say anybody in the east of London in these large warehouses coming to you, and saying, I do not want to be under the least obligation to the company; I do not require any of their privileges; I require this hydrant; you would say we look upon that so much in the light of a privilege that unless you take that view we will not put it up?—Yes, we are only bound to supply consumers; a man who puts up 100 of them in his factory is not going to pay us anything for them; he has means at his command to put out fire at any moment, and he pays nothing whatever unless he uses it.

3930. I have one of these hydrants constantly charged with high pressure, and I am told that every time I cut a seal that the company have put upon it I have to pay a guinea whether I use any water or not; do you carry out the same plan?—We should not treat you so; we should charge you with meter-rent if you had a meter, and charge you for the trouble of putting it up. You would have to pay rent for the meter, and also the cost of the water, but nothing else.

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3931. I get the means of putting out a fire which might not only do me a great deal of harm, but which might do all my neighbours a great deal of harm. The Act of Parliament says you are to give water for the purpose of putting out fire?—Only to public hydrants.

3932. I quite misunderstood you about the time that you credit your turncocks with; I understood you to say that it was not their statement only, but that it was their statement, confirmed by Captain Shaw, or confirmed by somebody?—I am sorry that I put it in a way which should lead to a misunderstanding; there is a certain amount of knowledge which the brigade have of the proceedings of a turncock at a fire; the company pay rewards to a man who bring them notice of a fire, which is commonly called "The Call"; they pay 1*s.* reward for that; the fire brigade pay the turncock who starts the plug 2*s.* 6*d.* for his activity in being there to start the plug quickly, and that gives them the opportunity of making any report, and they know what our report is, but I do not mean to say that they corroborate it by any signatures, or any act of attestation.

3933. In fact it is only blowing their own trumpets?—You may say to certain extent it is.

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Thursday, 3rd May 1877.

MEMBERS PRESENT:

Mr. Clifton.	Sir Andrew Lusk.
Mr. Forsyth.	Mr. M'Lagan.
Mr. John Stewart Hardy.	Mr. Onslow.
Mr. Hayter.	Sir Henry Peek.
Mr. Herbert.	Mr. Ritchie.
Sir James M'Garel-Hogg.	Sir Henry Selwin Ibbetson.
Mr. Kinnaird.	

SIR HENRY SELWIN IBBETSON, BART., IN THE CHAIR.

Mr. *Charles Greaves*, called in; and further Examined.

Mr. *C. Greaves.*

3 May 1877.

3934. Mr. *Onslow.*] WHAT is the length of the River Thames within your district?—I should think it was 10 miles.

3935. How much of it within the metropolitan area?—There would be from five to six miles on the border edge. It would extend from the middle of St. Katharine's Docks to Bow Creek at Blackwall.

3936. The wharves and store-houses along the banks of the river there are as high, if not higher, than in any part of London, are they not?—I should think they are, and the number of high buildings is somewhat increasing.

3937. And the height of the houses which are being built is more than that of the old wharves?—A good deal.

3938. Along the whole of that length, if I may call it so, of the Thames, what is the greatest pressure that you have?—There are places along that line, I cannot say that it is so universally, where we can put the water up to 70 feet by jet.

3939. What is the minimum pressure?—That I cannot say; I do not see that I have any means of knowing. The height which the water would reach to is very various. The mains are mostly terminal pipes; we have no thoroughfare or great street holding a large main continuously along the river at all. The portion of the district which lies against the river is a good deal cut up by docks and dock entrances; those pieces of London which are insulated, and have always been difficult to reach.

3940. But that pressure of 70 feet, or at all events the height to which you could eject water, as you say, is in a very few parts of the district; is that so?—No, I do not think so. In a general way along the River Thames, where of course the pressure is likely to be greater than elsewhere, it being the lower edge of our district, and the water declining to it, I should say from 40 to 50 feet is the height to which we should generally throw water along the Thames, unless there is some exceptional peculiarity in the way of its being a little narrow street in which a main of considerable size has never been either asked for or laid down.

3941. Do you know the heights of the highest warehouses in that district?—I do not know what they are, nor do I know which one would be the highest.

3942. Can you tell me about what the height would be to the top storey?—I do not know whether there is any warehouse adjoining the Thames 100 feet high; I should scarcely think there is.

3943. Supposing we take it at 90 feet; would that be about a fair height?—That would be some warehouse recently built.

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Mr. *C. Greaves.*

3 May 1877.

3944. Do you agree with Mr. Bramwell when he says, that "you do not in practice, even on a calm day, get more than about five-eighths of the height of the head, as a jet of solid water; I do not mean spray, but a useful effective power;" is that your experience as an engineer?—I do not think that is far wrong; it is not a point upon which we have ever made any very precise testing experiments.

3945. Five-eighths of 70 feet, which is your maximum pressure, would give, say, 40 feet for effective purposes in the way of putting out fire?—That is the height to which solid water would go in jet, some of the spray going beyond that.

3946. Some of the spray might on a calm day, but this is a very favourable comparison, because it is taken on a calm day; I am presuming the air is tranquil?—When I say we have had water thrown 70 feet, I mean really water; not merely a few drops. I have not got the memoranda of them; there have been trials at one time or another, but they have not been made specially for the purpose, and I do not think they have been kept.

3947. May I put the question in this way: Presuming that the height of a warehouse is 90 feet, with all your best appliances, and the highest pressure which you give at that point, how far up the house do you think you could, on a calm day, eject water sufficient for fire extinction?—I should think 60 feet in a great many places, and few under 50 along the Thames side, unless there are exceptional circumstances connected with the place in which the warehouse stands.

3948. That is to say, 60 feet out of 90 feet?—Yes.

3949. May I take it that you could do that in almost any part along the river in your district within the metropolitan area?—I do not know that; it is rather a venturesome thing for me to say, because, taking the Isle of Dogs, the road bordering the Isle of Dogs must be 200 yards from the edge of the Thames itself, and, therefore, the only way in which pipes could go to the River Thames would be through some branch streets.

3950. I do not exactly understand you?—There is a circuitous road round the Isle of Dogs which is not immediately on the wall, and not close to the river; it is within the line of what was formerly called the Embankment Wall, and the many of the factories are on the wall, and run from the wall outwards to the edge of the River Thames; therefore the access to every one of them is by a street branching out of the main circuitous road in the Isle of Dogs.

3951. You would require to have a hose of 200 feet?—There are pipes, but not pipes to which we have paid any attention as regards making them carriers of a high pressure; they have been laid down for the purpose of local supply in small streets where the factories happened to be located.

3952. May I take it that those pipes would not be of use in case of fire?—They would be of use in case of fire; many of them have hydrants upon them; they are not simply hydrants for the purpose of throwing a jet from the public streets, but there are hydrants carried up within the buildings, and that is what I beg to say is what the future of precaution against fire points to very much. The pipes will be carrried up within the buildings and hydrants placed on the different floors, so as to flood the floor; that is what is being done in a great many of the factories.

3953. Here in one district the minimum height to which the water is presumed to rise would be 23·1; could you tell the Committee in what district that is?—No, I am not aware where that is.

3954. You are not aware that that is a dangerous part?—No; not at all.

3955. I wish to put to you one question with reference to amalgamation; you are against amalgamation; you do not see that it would do any good?—You mean amalgamation financially.

3956. Yes?—It is a question which one ought hardly to answer in a single word. I do not see any great benefit to arise out of it, but I should beg to say this: An honourable Member asked me whether the saving of the fees to boards of directors would make any great impression upon the financial result of amalgamation. I should like to put this view before the Committee: There are other things besides directors' fees which form a large item in the gross expenditure of a water company. I will take the poor rates, and rates and taxes in the gross. If amalgamation means transferring the whole of the water companies'

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companies' affairs to a general water trust, municipal or otherwise, is it to be assumed that the whole of the property transferred will continue to pay rates or not? I believe, and Sir James Hogg will confirm me in that statement, that the sewers do not pay poor rates. If the water supply were not to pay poor rates, and to be excused as being public and municipal property, that would be a figure of a very large amount, which would very much eclipse anything like the directors' fees in question. The amount of poor rates in our company are very large; it is not very far from one-tenth part of our gross income; and taking London altogether, the poor rates amount to one-twentieth part of the gross income, as you may find from Mr. Stoneham's annual report presented to Parliament; therefore that is a very large item of the question. Then again, taking the opposite view, supposing the boards of directors done away with, and the proprietary nature of the water companies done away with, and that there is no longer any personality or individuality about them, who, then, is to fight the question of poor rates? We are continually in hot water with boards of guardians, with all their arrangements, and with the surveyors and vestry clerks; they are all blood-suckers in every direction. There is not one of them who would not get the last farthing from us if he could. The putting up the value of our property is a matter of continual action; and supposing there to be no longer any personality or individuality in the management, what is to hinder boards of guardians from doubling the poor rates in a very short time.

3957. But irrespective of those considerations, and irrespective of the charges of management, have you ever made a calculation of what the actual cost of amalgamation would be, including buying up the companies and laying down fresh mains, which I should imagine would have to be done?—We do not imagine that there would be any necessity for laying down any fresh mains, unless it is to be assumed that the fire arrangements are to be put upon an independent set of mains, and made infinitely more potent than they are.

3958. May I ask you this question: I cannot lay my hand upon it, but I think the honourable Chairman agrees with me that we have had evidence to this effect; that if the companies were to be amalgamated there would require to be a reconstruction of mains in a great many parts of London?—I fail to see that in any way. I should say that a municipal body, if they took over the waterworks, would take them over in a very efficient condition; they are amply supplied with mains at present. I am sure the mains of the East London Water Company, which bring water into London, if they were united together, would give a pipe of six feet diameter.

3959. In answer to the honourable Chairman you stated that if the companies were amalgamated a great number of subdivisions would be required?—I said that the subdivisions which we have been obliged to make for our own purposes would remain as necessary under the management of a municipality; it would have to be managed by engineers under the municipality, and I cannot see that the engineers under the municipality would act very differently from the engineers under the companies.

3960. Supposing all the companies were amalgamated, do you think as many engineers would be required as the different water companies now have?—You would pay as much for engineering, I am quite sure, and probably more than you do now.

3961. You think they would require a greater staff of engineers?—They would pay them more, but I might say that, with regard to the comparative expense in the management since I have been engineer to the East London Water Company, the company has become three times larger than it was, and being a proprietary concern, and interest, profit and dividend being an essential part of the management, you may take that as the touchstone of the whole thing; but though we are three times as large we cannot make a better interest than 6 per cent.; we have only paid 6 per cent. all through, though we are three times as big as we were, and we cannot increase it.

3962. And you would pay less if there were a greater pressure?—If the result is favourable as compared with the result of what has been done, when we have finished all we contemplate, possibly we may be able to give greater pressure without greater waste.

3963. Whenever you are asked by a particular individual, or a company, to

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place a hydrant, I suppose you do so at once? —No, not exactly at once; every one who has a hydrant signs a stamped agreement; he comes to us for a supply of water, and we give him a supply; we say nothing about the hydrant; we do not say that our company are to be excused from liability with respect to fire as some companies do; some companies actually make the party asking to have a hydrant, and to take a supply of water, to sign the words, saying the company are distinctly excused from liability in respect of fire.

3964. With regard to the locality of the hydrant, does your engineer go into that question, or do you put it where the demand is?—The hydrants put down by manufacturers are within their own premises; we advise slightly, but we refrain from entering too much into the matter from a fear of being thought to have any liability in the matter; it is more for the owners to know where is the convenient place, and where his vulnerable points are, than for the company to decide it.

3965. I think I understood you on the last occasion to say that when a fire is put out by the fire brigade, officers from your company are left to see that the fire does not break out again?—The turncock or his deputy remains or leaves some one in attendance, but I think I must have referred to the men of the brigade who are left to see that the fire does not break out again.

3966. Do you know any case in which the brigade have left until they had perfectly satisfied themselves that the fire would not break out again?—No; the brigade always satisfy themselves that the place is perfectly safe before they go. There is no doubt about that. I think I merely said that the engine left, while the fire brigade men remained in charge.

3967. As a waterworks engineer of long experience, you are of course thoroughly familiar with the laws which govern the flow of water through pipes? —Yes, I know something about them. I do not know that I could stand a very long examination on the laws.

3968. Assuming the diameter of a pipe to be constant and the quantity to be constant, is it not the fact that friction increases directly as the length of the pipe increases; that is to say, if you require a certain head or pressure in feet of water to drive a quantity through a length of 100 feet of pipe, it will require double that head of pressure to drive it through 200 feet, and ten times to drive it through 1,000 feet?—I think that is the law, but I am not at the present moment quite *compos mentis* upon the mathematical rules of hydraulics.

3969. Is it the fact that the diameter and the length of the pipe remaining the same, the resistance from friction will increase as the square of the velocity, which under the circumstances will, of course, be as the square of the quantity; that is to say, if it takes a certain head in feet or pressure to drive 50 gallors a minute through a certain length of a certain size pipe, would it not take four times that pressure to drive double the quantity?—These memoranda you appear to have taken from some special work on the subject, and I should imagine they are correct. We do not find that mathematics serve us much in the practical distribution of water for a water company. If we were to supply the different factories and trades according to a mathematical formula, or anything that required to be worked out by a book of logarithms, I do not think we should satisfy the public very readily.

3970. Is there no practical way for water engineers to test the exact loss of power by friction by meeting together and actually testing by some particular case or cases?—The friction is so excessively various; there are hardly two examples in which the question could arise which are similar to one another; we do not care to know what the friction is; it is of no service to know what it is; we have a certain source of power and we have a certain level for delivery. A pipe may be judged of and laid down by men who never knew what a mathematical expression was; the experience of it which has been in the hands of the parties hitherto would be their better guide than anything mathematical as to what should be done in the way of enlargement or addition. If you find the required pressure of a district too high you either raise the pressure at the source, namely, at the engines, or you lay an additional main; sometimes you come in with a 20 or 24-inch main; the last main I laid in the heart of London was a 30-inch main, which we filled from our highest source right into the middle of Victoria Park. Now no mathematics would have told me that a 30-inch main was

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was the right main to lay down there, because that was a main laid down for the future.

3971. I am dealing more particularly with the friction through the hose?—What is the difference between a leather pipe and an iron one as to its diameter?

3972. The friction in one is the same as in the other?—I have never critically inquired into the difference of frictions. I do not know what it would be; the smallest iron pipes that we ever lay for the service of houses are three inches; all our service pipes are 3 or 4 inches; there may be a 2-inch pipe here and there, and the hose may be 3½ or 3¾ with 2-inch coupling; but I am unable to say what is the precise relation between the friction of one and the friction of the other. Water is delivered for all kinds of purposes through 100, 200, 300, and 400 feet of 3-inch pipe.

3973. Mr. *Ritchie.*] I have only one or two questions to put to you: I understand you give all the pressure you are required to give by your Act of Parliament, do you not?—We give the pressure and more, but we do not maintain the pressure where there is no use for it and no demand for it.

3974. There were some tests made by Sir Joseph Bazalgette, at one or two points in the Tower Hamlets, which I do not know whether you can explain; I will refer you to Question 5635 in the evidence of Sir Joseph Bazalgette; he gives two instances in which in the east end of London there would be a deficiency of water, owing to the size of the pipe not being sufficient; one of those instances is at St. Thomas's Church, Shadwell, where in consequence of the size of the pipes through which the water has to pass they would be quite unable to supply the quantity of water that would be required to put out a fire; will you kindly explain that to the Committee?—Sir Joseph Bazalgette said, "Supposing a fire to take place at St. Thomas's Church, Shadwell, or in that neighbourhood, as far as I can gather from the map, the water would have to pass from the reservoir through 220 yards of 7-inch pipe, 720 yards of 12-inch pipe, and 1,200 yards of 9-inch pipe. To supply 13 engines, you would require a pressure of 219 lbs. for the whole number; therefore, if a large fire, requiring all the engines in that part, occurred, it would not give a sufficient supply." I think that is perfectly true; I do not suppose there is water enough there to supply 13 engines; it is not likely.

3975. That appears from Sir Joseph Bazalgette to be in consequence of the size of the pipes through which the water passes through?—That is one of the reasons.

3976. Sir Joseph Bazalgette is the engineer for the Metropolitan Board of Works?—Yes.

3977. And they have charge of the machiney for putting out fires in London; has your attention ever been drawn to that condition of things either by the Metropolitan Board of Works or their engineer?—Not at all in any official way.

3978. Sir Joseph Bazalgette goes on to give another instance in which at Wapping Church there would not be sufficient water to supply nine engines, in consequence of the size of pipes through which the water would have to pass?—I should think that it would almost be certain to be the case, that there would not be water enough to supply nine engines there.

3979. I suppose your attention has not been drawn to the matter by the Metropolitan Board of Works, or by their engineer?—No, certainly not; I do not know that anybody has thought of nine engines being required down in the centre of Wapping. Wapping was formerly an island, taken up by the London Docks, and covered by small houses for residence. Of late years they have been all polished off, and the ground occupied for warehouses round the Thames, built of considerable height, and containing great value of stores; those warehouses have, to a great extent, perhaps more so than in any other part, fitted themselves out with internal water-pipes and hydrants on their own floors; there are many of them which could flood any floor they have got.

3980. Do you mean to say that you have sufficient pressure in the pipe to supply the floors of those high warehouses at that point all day?—All day.

3981. Therefore, though you may not have sufficient water to supply 13

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engines pumping, yet you do give a constant high pressure in the district where these warehouses are?—Yes, and receive a considerable amount of payment as high service money.

3982. Sir Joseph Bazalgette was asked at Question 5637, "Of course if that is the condition of things, I suppose the affixing of hydrants to mains charged in that way would be out of the question?" to which he replied, "It would be altogether out of the question"?—I see that Sir Joseph Bazalgette stated that.

3983. In answer to that, do I understand you to say that you have already fixed a great many hydrants on your pipes, and taken a considerable amount of money from the owners of the warehouses for a high-pressure supply?—We have allowed those hydrants to be fixed.

3984. You disagree with the evidence which has been given upon that point?—I must decidedly disagree with it, because it contemplates the working of 13 and nine steam fire-engines; we have never contemplated the working of 13 and nine steam fire-engines in those places; steam fire-engines are a modern invention; it is only during the last few years that steam fire-engines have been purchaseable at all, so that it would have been impossible to imagine the working of so many steam-engines at that point.

3985. Does the water which supplies those hydrants pass through those pipes which Sir Joseph Bazalgette speaks of in his evidence?—Certainly it must, but I will take the liberty of making this remark, that it is hardly fair to enumerate a series of pipes running a long distance in this way, as though they were the only pipes. The map which I exhibited to the Committee the other day showing all our mains would prove that our mains are intersected and interlaced in all directions, therefore the route by which the water would come to any particular place would be through half-a-dozen mains, so that it would be much more potent than if drawn through one particular pipe.

3986. I take it that, on the whole, you are not prepared to say you could supply water sufficient for the pumping of 13 engines at any one point in that particular district, and that there is no likelihood of any fire occurring in that particular district which requires the services of 13 engines for the house property?—For the house property certainly not.

3987. And that for the warehouse property you do already supply, through the pipes spoken of by Sir Joseph Bazalgette, water all night at sufficient pressure with constant service?—Yes, we do.

3988. Your pressure by the Act of Parliament is 40 feet, is it not?—Forty feet from the pavement in front of any house.

3989. Did you receive a communication from the Metropolitan Board of Works dated the 25th June 1866, which was a report from Captain Shaw, in which he says: "The course which I would recommend for obviating this inconvenience would be to discontinue the existing intermittent service, which is complicated and imperfect, and requires special men to work it, and to substitute for it a constant service, with a sufficient number of hydrants which could be opened by any one, and would immediately deliver water, without the delay of proceeding to a distance to open one sluice cock and shut a number of others;" you, along with all other water companies of London, received a copy of that communication, with a request that you would give them an answer, and I find that your answer was: "The company are prepared to comply with the provisions of the Act of 15 & 16 Vict. c. 84, and of the Act of 28 & 29 Vict. c. 90. Upon receiving a requisition from the Metropolitan Board of Works, the directors will give the subject immediate consideration;" you sent that reply?—I have no doubt we did.

3990. Are you aware whether you have ever received from that time to this any reply from the Metropolitan Board of Works or any requisition to carry out, any further than you had already carried out, the provisions of the Act of Parliament under which you then existed?—I have no recollection of anything in the form of a requisition, and scarcely anything in the form of correspondence, unless it is that which has been initiated by the correspondence which we ourselves initiated.

3991. I take it that the position which you took up at that time is the position that you take up now, and that you are prepared, upon being requested by the Metropolitan Board of Works, to carry out all the obligations of the Act of Parliament

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Parliament under which you were established?—That is so. We are in favour of hydrants being placed everywhere. We have made no secret of it.

3992. *Chairman.*] An honourable Member wishes me to ask you with regard to your answer to Question 3574 on the last occasion, as to gauges, and you stated that, "Afterwards that pressure increased considerably, and the measurement of the height of the jet became rather troublesome, and a great loss of water was incurred; the pressure was much above what it had formerly been, and some gauges were erected by which a continual diagram is drawn, showing the elevation of the water by a pressure machine continuously, night and day"; could you put a copy of such a diagram in?—I will (*handing in the same*). The paper is wound round a cylinder; the cylinder is moved by clockwork; the pressure is taken by an apparatus precisely resembling a barometer. The indicator floats upon the pressure-gauge of this barometer, and at intervals of four minutes by a contrivance a pricker is darted on to the cylinder and makes its mark, and as soon as the pricker has made its mark the operation of another part of the instrument drives it back again, and then after another four minutes it makes another mark, so the result is a series of pricks, which are afterwards connected by a line.

3993. By that you get the actual pressure night and day?—Yes; the fact that it drops here and there shows the advisability of having this register. There were two or three things asked for on the last occasion which I was not provided with, namely, the quantity of water delivered hour by hour. I was only able to give the per-centage of the whole; this shows the per-centage and the quantity given per hour. The number of plug-pipes issued by the company was asked for. I am sorry to say that we have not those for the metropolitan district specially, but the argument is as good for the whole district. Those are the number of plug-pipes for the whole district issued yearly, and separating those issued for new work from those issued for repairs. Then I have here the quantity of fire-plugs which are sent out half-yearly. (*The Papers were handed in.*)

3994. The Committee perceive by those pressure diagrams which you have handed in, that during the night time the pressure seems to drop very considerably; that is shown on many of those diagrams?—Yes, that is so.

3995. That I suppose represents a diminution in the pumping power?—It is caused by a diminution in the pumping power.

3996. Therefore for the purposes of the fire brigade, during the night when the power had so diminished, you would not get the additional pressure which you would otherwise have by the ceasing of the drain for the domestic supply?—Precisely so.

3997. But whilst the pressure in the day time as you represent is considerably above the 40-feet line, the pressure then is being drawn upon for the domestic supply?—Yes, the pressure is maintained considerably above 40 feet, notwithstanding the drain upon it.

3998. Then there would be a pressure amounting to this number of 40 feet delivery during the day time when it was so marked upon this paper?—Yes.

3999. But that where it fell below, as it does in many places during the night, there the pressure would be diminished?—It falls below that, notwithstanding the cessation of the day supply.

4000. It has been pointed out to the Committee that the greater number of fires take place during the evening?—That is so.

4001. Under those circumstances, the pressure for fire purposes at the time you most wanted it would not be so strong as during many hours of the services?—That is so no doubt, but that arrangement is not inherent in the system; the water is there to the extent which the fire brigade require; we have not got hydrants, and are not in a position to discharge water into the upper floors.

4002. If the hydrants were put down and a pressure was required continuously, there is nothing to prevent your doing it?—Nothing at all; when it comes to that point it is a pocket question.

4003. Is there anything which you wish to add to the evidence which you have given?—I think I have stated all that I wished to say with respect to the subject

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subject of amalgamation; but with regard to the question of putting fire-plugs on to the mains, it is 10 or 12 years ago since I broke up at Old Ford the stock of pipes with the bosses on them for the purpose of keeping fire-plugs on mains; I merely mention this as implying the cessation of the practice of putting fire-plugs on mains.

4004. And that confirms what you stated, namely, that practically fire-plugs are not placed on any of the mains of your system?—They are not. In old times before the present increase of pressure, and before the present style of steam fire-engine was invented, we used to say as a familiar observation, that if the spout of the fire-plug rose three feet above the pavement it was considered as good as a manual engine; that was the turncock's observation, and if a dummy or temporary hydrant was put into a plug even with the small aperture it had, it would throw a jet of water over to a fire as well as a manual engine; now, there are plugs in some part of the town which with one spout of water will feed two steamers; that shows what a considerable improvement in the pressure there must be to get that issue of water.

4005. Sir *Henry Peek.*] I think you stated that the practice was that if you could deliver water at the surface, that was practically all that the fire brigade required?—They take no more and use no more; we feel ourselves under a slur that they do not make more attempts to use it. With regard to the question of supply to the waterside property, it deserves to be remembered that the Thames side property is accessible to the floating engines of the fire brigade, and that the dock property is all accessible to the floating engines of the dock companies, because all the docks have floating engines of their own within them.

4006. *Chairman.*] And the hydrants which they have laid down go to supplement the fire brigade?—Yes; that they may take the water at once into the place where the fire may occur. As far as we know about the pressure, the dock companies are satisfied that we are doing our duty. Of course when anyone claims a higher pressure, we cover ourselves by the 40-feet clause. I do not mean to say that the docks would not like to have a higher pressure if they could get it, but, as far as they are connected with us, they are satisfied. Then I beg the Committee will take into their recollection the Metropolitan Board of Works said that they made a house-to-house inquiry in that part of our district where constant supply had been carried out. They told us in 1873 that they were making this inquiry, and something came out about it in 1876, but they never ventured to give us any information with reference to what arose out of it, and we do not know what the results are, and it would have been much more agreeable, I think, for two large bodies to have passed some communication upon this subject from one to the other. We had offered them every kind of information upon the subject of our works which we could give, and as they had made this minute inquiry, I think it would have been but courtesy if they had given us a little information about it.

4007. Sir *James M'Garel-Hogg.*] I would ask whether the company ever applied for that information?—No, they did not, but I think the tenor of their letter shows that it would have been acceptable. So with regard to the pressure there is in the ends of these mains; if any communication had come to us, we should have said, "We are perfectly ready to show you what our pressure is," and we should have avoided then any connections being put in places where it was hardly fair; that is to say, where the supply might be assumed to run off all the pressure that was in the mains, such mains as they were, because it was obvious they were not carrier mains, or even the minor mains of the company.

4008. *Chairman.*] Is there any further point you wish to mention to the Committee?—I may say that I hope something will come out of this examination and inquiry, because at present there is no law whatever as to putting down fire-plug pipes, and putting down fire-plugs, or putting covers over the plugs, or paving round the plugs, all of which matters have to be done over and over again.

4009. Do you mean with regard to repairs?—The putting down, repairing, and maintaining is under no law; the companies do this out of their own good nature,

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nature, and it is very little more. There is a certain amount of power given to the public authority under the Waterworks Clauses Act, but the Waterworks Clauses Act is an Act which has had very little operation in London; it is scarcely ever invoked; these things were supposed to be done in the early days at the request and instigation of the parishes and vestries, the overseers and guardians.

4010. The local authorities used to have the power of putting them down until the Metropolitan Board of Works got the Fire Brigade Act passed?—Yes, until then, but these things were done then, and are done now by the water companies at their own expense without any memorial or instigation, or any offer to pay anything.

4011. Mr. *Ritchie.*] Is there any obligation upon the companies to lay them down?—There is no obligation except at the instigation and requisition of some party.

4012. *Chairman.*] But there is power under the last Act for the water companies to put them down and charge the expense of them to the Metropolitan Board of Works, when a requisition has been made?—Yes, that is the very thing. We have been hoping that some inquiry would be made which would adjust these matters between us and the authorities; it is a very great defect in a city like London, with such property as exists here, that it should be left to the free good nature of the companies to put down these hydrants and other things. If this duty does not lie (as we assume that it does lie under the last Act with the Metropolitan Board of Works), then the Act of 1871, as far as it relates to that point, is repealed.

4013. That Act seemed to indicate that a fresh authority was set up, and what you would submit to the Committee is, that for the purposes of working, that Act is a dead letter?—Yes, it is.

4014. There is another question which an honourable Member wishes me to ask you; you spoke of the height of these new warehouses and buildings which were being erected in London, making it very difficult for your existing pressure to reach them; are you aware whether the insurance offices charge a higher rate upon those houses, which are, to a certain extent, unprotected?—I have no means of knowing that, nor do I know it, but I take it is a simple conclusion that where the water does reach, the insurance is less.

4015. You cannot speak to that from your own knowledge?—I cannot speak to it, chapter and verse.

4016. I think when I asked you whether the insurance companies reduced the rate of insurance where hydrants were put, you were not able to say?—No, I was not able to say, but I should take it to be so, as a matter of ordinary intelligence. I would add that if the laying down of hydrants in London cost half a million of money, no half a million of money in the world could be better spent, because if London were "hydranted" all over, what would be the necessity of paying the enormous insurance which we pay now. I am quite sure if at my own small house I had a hydrant in front of me or my neighbour, I should not insure at all.

4017. Are there many music halls that you are aware of supplied in your company's district?—There has been a return of them placed before your Committee recently.

4018. Are you aware whether your company supply those music halls with water by means of hydrants?—No, I think I might say as a rule they do not; they have small supplies for the use of the place, but not hydrants within them.

4019. That is to say, supplies without the additional pressure, and without the hydrant facility?—Yes.

Mr. *Alexander Dickson*, called in; and Examined.

Mr. *A. Dixon.*

4020. *Chairman.*] I BELIEVE you are Secretary to the Kent Waterworks Company?—I am.

4021. Can you describe the company's district in the metropolitan area?—It would

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would perhaps be more conveniently described from the map which is before the Committee. The company's district commences in the parish of Rotherhithe; it includes the parishes of St. Nicholas and St. Paul's, Deptford, Greenwich, Woolwich, Charlton, Plumstead, Eltham, Kidbrooke, Lee, Lewisham, Blackheath, and part of Camberwell.

4022. Those are all within the metropolitan area?—Yes. (*The Witness pointed out the boundary of the company's district within the metropolitan area.*)

4023. Can you tell the Committee what the number of miles of streets is that are within the Kent Company's districts in which your pipes are laid for water supply?—One hundred and fifty miles, and of those 80 contain pipes under constant pressure, and 70 have pipes under intermittent pressure,

4024. Are the 80 miles of pipes under constant pressure generally distributed throughout the district, or are they condensed in particular areas of that district?—They are distributed generally throughout the district in all the leading thoroughfares, and they are shown upon the map by red lines.

4025. Those are the principal mains which are under constant supply at this time?—Yes, they are.

4026. What the last witness told the Committee I believe you confirm, that within the company's district the powers with regard to fire-plugs were exercised by the local authorities up to the time when the Metropolitan Board of Works got their Fire Brigade Bill passed?—In two instances only were the powers of local authorities exercised as regards the provision of hydrants for the extinction of fire within this district.

4027. But I mean that fire-plugs were originally put down at the instance of the local authorities until the Metropolitan Board of Works became the controller of the London Fire Brigade system?—In those two cases only were fire-plugs put down at the instance of the local authorities prior to the transfer of the duties of the local authorities to the Metropolitan Board of Works.

4028. There were, before the transfer, two places which had required the placing down of hydrants?—There were.

4029. Which were those?—The parishes of Greenwich and Woolwich; there were a few hydrants put down in both of those parishes at the request and at the expense of the local authorities.

4030. Were they put down in any number?—In the parish of Woolwich there were 44 fixed, and in the parish of Greenwich there were 12.

4031. Your company, of course, have supplied fire plugs generally throughout their district?—Yes, they have one or more in every street.

4032. Have they ever received any requisition since the passing of the Act of 1871 from the Metropolitan Board of Works to fix plugs upon mains?—Since the passing of the Act of 1871, yes; we had not until the passing of that Act received any requisition from the Metropolitan Board of Works under the Act of 1865, to place plugs upon the mains in any part of the district.

4033. What communication took place between you and the Metropolitan Board of Works at the time the transfer took place?—In July 1866 the Fire Brigade Committee addressed a letter to the company, with which they enclosed a copy of a Report made at the time by Captain Shaw, relative to the inconvenience then sustained in finding water at fires, and the course which he recommended for obviating such inconvenience, and expressing the opinion of the Committee that the course suggested by him, namely, the establishment of constant high pressure, with the provision of a sufficient number of hydrants by the water company, would be the best calculated to meet the object in view.

4034. That letter, coming from the officers of the Metropolitan Board of Works, suggests that if there was a constant supply in your pipes, hydrants would be the proper means of utilising that supply?—Yes; the letter which was addressed to the company is as follows: "9th July 1866. Sir,—By direction of the Fire Brigade Committee of this Board, I beg to forward you, on the other side, for the information of your Directors, a copy of a Report which they have reeeived from Captain Shaw, the chief officer of the fire brigade, relative to the inconvenience at present sustained in finding water at fires, and the course which he recommends for obviating such inconvenience, and I am to express the opinion of the committee that the course suggested by him, viz., the

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the establishment of a constant high-pressure service by the water companies, would be the best calculated to meet the object in view. I am, Sir, your obedient servant, *John Pollard*, Clerk of the Board. To Griffith Thomas, Esq., Secretary of the Kent Waterworks Company." The Report by Captain Shaw, which accompanied it, will be found at page 667 of the Appendix.

4035. That report was forwarded to you in this letter, in which your attention was called to the fact that inconvenience had been found in getting water at fires?—Yes.

4036. And the purport of Captain Shaw's letter was suggested to you as a means by which you should obviate that difficulty?—Yes, the provision of "constant service with a sufficient number of hydrants."

4037. Did the company make any answer to that, and what was the effect of that answer?—This is a copy of the letter which was sent in answer by the company.

4038. Will you read the principal points of it?—The directors requested the then secretary of the company to acknowledge the receipt of the letter and to enclose with it a copy of the report of their engineer to whom Captain Shaw's report had been referred, and this extract was made of the report of the company's engineer upon Captain Shaw's report: "Constant service for extinguishing fires necessarily implies the adoption of the general constant supply contemplated in the 'Metropolis Water Supply Act.' For this the company, on their part, are perfectly prepared; and on the necessary requisition from the inhabitants, and their compliance with the provisions of the Act for the prevention of waste of water, such supply could at once be given. Though for the adoption of constant service the company have to await the co-operation of the public, yet great assistance could be given in extinguishing fires if the mains of this company that are always under pressure had a systematic use made of them." Then the letter goes on to state the difference between mains and services. The Committee probably appreciate that difference so I need not read that paragraph. Then it goes on, "If hydrants were fixed to the mains, water at all times could be obtained, and Captain Shaw's recommendations at once, to a great extent, be carried out. The company have now 50 miles of mains under constant high pressure, and though the advantages of hydrants thereon have been repeatedly urged on the several parish boards, Woolwich and Greenwich are the only towns that have yet placed any hydrants on the mains: Woolwich to some extent, and Greenwich partially. These hydrants have been repeatedly used with great effect in cases of fire."

4039. Those were the 44 which you have previously referred to in Woolwich, and 12 in Greenwich?—They were. Then it goes on: "In connection with the company's works fire mains have been laid down to the victualling and dockyards at Deptford, to Greenwich Hospital, to the dockyard at Woolwich, and, with the exception of the Arsenal, to the whole of the military establishments. At Woolwich the pressure on these mains is uniformly sufficient to throw water over the whole of the buildings under protection without the aid of fire-engines, and without a minute's loss of time. From the same sources and with the same results the company's mains, if provided with hydrants, could be made available for public use. As regards hydrants on the services, they would be useful, but, from the smaller diameter of the pipes and their connection with the house supply, they would not be so effective as the hydrants on the mains; and until constant supply becomes practicable the assistance of a turncock would be necessary."

4040. I see there is no date to this letter. Can you state the date when the answer was sent?—I have not the date; the reason is simply this, that I have taken this copy of the letter from Paper 13 as a convenient mode of submitting it to you. It appears in the superintending architect's report appended to the last year's evidence. The letter continues with regard to obtaining the services of turncocks. "The directors wish me to add that one great cause of delay experienced in their district is the want of system in summoning the aid of the company's servants, and are desirous that it should be impressed upon the officers of the Metropolitan Fire Brigade that it is of equal importance that plugs, hydrants, and other appliances be opened, as that there should be a prompt attendance of a fire-engine. At present the seeking of a turncock or other qualified person to open the plugs and hydrants appears to be left to chance, or

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altogether neglected. An instance has occurred at Woolwich where premises were destroyed within a few feet of a hydrant on one of the company's mains, when water in abundance could have instantaneously been obtained by any person with local knowledge. The directors admit the extreme importance of this subject, and will be glad to co-operate with your Board to give the fullest effect to the company's ample means of water supply, and at all times to furnish the fullest information in their power on any matters connected with this question."

4041. That was your answer to this letter from the Board enclosing Captain Shaw's recommendations?—Yes.

4042. Was there any action taken by the Metropolitan Board of Works in consequence of your reply to them?—No; no action was taken upon that letter, and during the interval between the transmission of this letter and the passing of the Act of 1871, the only reference that was made to this subject was contained in the complaints which were from time to time presented by the Metropolitan Board of Works of delay in the arrival of turncocks at fires.

4043. There were several such complaints, were there not?—There were, and some of them were in the light of the letter which I have just read, and in the absence of any systematic arrangement for calling the turncock, regarded as being somewhat unnecessary.

4044. Did you point that out to the Metropolitan Board of Works in your answer?—Yes; that was pointed out to the Board in a letter from the company upon the 20th of May 1869, to this effect: "Sir,—Your letter of the 14th instant, in which you request me to call the attention of the directors of the Kent Waterworks Company to the fact that no turncock was in attendance at a fire which took place in Arthur-street, Old Kent-road, on the 5th instant, has been placed before them, and they have desired me to reply that upon investigation of the matter they learn that a fire did break out in Arthur-street on the 5th, and that on an alarm by a police constable the owner of the premises extinguished the fire with one bucket of water. Your communication is the first intimation of the occurrence of the fire which has reached the directors or any of the servants of the company. I would remark that the directors do not see the object of your repeatedly calling their attention to the trifling alarms of fire where the attendance of the company's servants is not applied for, nor a supply of water needed."

4045. This Committee has had before it in evidence several specific statements, I think, with regard to the want of a sufficient supply of water?—In the last year's evidence Mr. Hamlyn, at Question 1854, when being asked by the honourable Member for the Tower Hamlets as to the number of occasions on which there had been unsatisfactory water arrangements in the south during the previous year, amongst the list of cases handed in, cites two as occurring in the Kent Company's district; one on the 15th of February at Loam Pit Hill, Lewisham, in which it was stated there was no water, and one on the 25th of March at South-street, Greenwich, in which it was also stated that there was no water.

4046. Have you any explanation to give with regard to those cases; was there a deficient supply of water?—Inquiries have been instituted, and it has been ascertained that the fire at Loam Pit Hill, Lewisham, occurred at a small house in the high road about five o'clock in the morning; it was not an important fire or an extensive fire; it was extinguished by the occupier and the neighbours, and the services of the fire brigade were not required. With regard to the provision of water at the disposal of the fire brigade for that fire, had it been needed, there is a 10-inch main passing in front of the premises, and within 25 yards of the spot there is a stand-post used for road watering purposes, from which a supply could have been instantaneously obtained, and there is also a plug within a yard or so of the stand-post.

4047. Were all these there at the time of the fire?—Yes, at the time of the fire the plug was there, and the hydrant also was there for the supply of road watering.

4048. And that is one of the instances in which the return stated there was no water?—Yes; three engines, one from Lewisham, one from Blackheath, and one from Greenwich attended, but in neither case were the turncocks summoned, though the turncocks were then living within a very short distance of the fire-brigade station.

4049. What

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4049. What was the case with regard to the fire at South-street?—That was caused by the ignition of some goods in the window of a baby-linen shop, and was put out by the person in charge before the arrival of the brigade. The nearest plug was 22 yards distant; there is a large main also passing the front of these premises, and there is a hydrant at about 100 yards distance from which an instantaneous supply was procurable.

4050. You had no further communication at that time, had you, with the Metropolitan Board of Works?—In 1869, the same year as that in which the letter I last read was transmitted to the Metropolitan Board of Works, on the 11th of August, complaints were again addressed to the company of the late attendance of turncocks at several fires, and an investigation into the facts was made, and a copy of the report of the officers of the company thereon was transmitted to the Board.

4051. Will you state the material points which you submitted to the Board as bearing upon this; did you point out the number of miles of mains that you had under constant pressure?—The letter states: "Your Board having directed the attention of this company very frequently to this subject;" that is, the attendance of the company's turncocks at the fires; "they think it may not be out of place to submit to your Board some observations with the view, if possible, to bring about some arrangement for a readier command of water, and some systematic co-operation between the several bodies to whom is entrusted the safety of the metropolis in case of fires. It is the duty of the water companies to provide at all times a due supply of water at sufficient pressure for extinguishing fires, and I apprehend it rests with your Board to provide apparatus and other appliances for the effective use of the water, while the police should give general assistance and protection to property endangered."

4052. That was referring to the last Act which, as you assert, lays upon the Metropolitan Board of Works, as the authority, an obligation to pay for these appliances?—To provide all these appliances, that is to say, the Fire Brigade Act of 1865.

4053. Did you in that letter refer again to the available supply which you had for these purposes?—Yes; the letter informed the Board that "The Kent Waterworks Company maintain by their machinery a constant pressure on all their mains (about 80 miles), aided by reservoirs at various altitudes varying from 163 feet to 314 feet above Ordnance datum. These mains thus charged are available for hydrants, from which, if fixed, water at full pressure could be obtained at all hours day and night. The street services are connected with the mains and commanded by cocks. Upon opening these cocks, these services can at all times be charged with water at full pressure. At frequent intervals plug-pipes are placed on these services, and are used for cleansing the pipes, supplying the inhabitants with water in times of severe frosts, and also for the supply of fire engines. With the exception of Woolwich, and partially in Greenwich, no steps have been taken by the several parishes to avail themselves of the use of these mains, or to co-operate with the company in any way for the improvement of the means of extinguishing fires, though they possessed full Parliamentary powers for this purpose; nor have any steps to this end been taken by your Board, their successors."

4054. Then you point out also the promptitude with which your turncocks have attended when they have been summoned?—This letter stated that "the average of the interval between the summons and the first flow of water from the fire-plug at the last 50 fires being 7½ minutes." The letter continues: "The repeated communications from your Board to the directors of this company of the late attendance of the turncocks, must therefore have reference to the interval between the breaking out of the fire and the first flow of water, and the directors, with a view to a more speedy service of water, suggest a co-operation of all concerned in this duty." Then the letter points out that "the naval and military establishments at Deptford and Woolwich, and the principal factories in the district, are systematically protected by this company, and precisely the same means are at the service of the inhabitants and of the Kent districts."

4055. You pointed out in that letter, did you not, that the intermittent supply could be made available for the fire brigade by indicating certain spots where, by turning the supply into the service-pipes, they would become practi-

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cally useful also for hydrant purposes?—Yes, the letter states that, "where the supply is intermittent some arrangement should be made that would indicate the exact spot in every street where the use of a key would enable any officer of the fire brigade to procure instantaneously a full supply of water."

4056. Was there any notice taken of that by the Board?—There was no reply to that letter at the time, and in the following October 1869, the same year, no arrangement having been made by the Board for the summoning of the turncocks, and two fires having happened upon the 28th of September and the 5th of October, the turncocks having received no summons in either case, Mr. Morris, the late engineer of the company, addressed a letter, on behalf of the company, to the clerk of the Metropolitan Board of Works, calling his attention, or the attention of his Board, to the instances of failure to summon the company's turncocks, and stating that, as a considerable interval was, in many cases, suffered to elapse between the breaking out of the fire and the calling of the turncock, and at times that duty was altogether neglected, the directors of the company requested to be informed upon whom the duty rested.

4057. You did get an answer to that letter, did you not, from the Metropolitan Board of Works, in which they stated that they proposed, in future, that the brigade should be instructed to call the turncocks; was not that so?—Scarcely so; the letter that we received from the Metropolitan Board of Works, informing us of the arrangement they had made for summoning the turncocks, was written upon the 11th of November 1869. I will read a copy of it, because it was forwarded to the company upon some correspondence which had ensued between the Fire Brigade Committe and Mr. Quick, the engineer of the Southwark and Vauxhall Water Company.

4058. It was sent to your board of directors, was it not?—It was sent to the company, but not in answer to our letter of the 7th of October.

4059. It followed upon your having made that representation, and the next communication that you received was the communication which came in that way?—Yes, the communication was to this effect, that the Fire Brigade Committee had directed an order to be issued to the brigade to the following effect: "That immediately on information of a fire being received at a station a fireman or other responsible person should whenever it was possible, be at once sent to summon the turncock."

4060. There was a fire I believe at Rotherhithe in November 1869, which led to a further correspondence with the Metropolitan Board of Works?—There was a fire at Messrs. Campbell's cooperage in Trinity-street, Rotherhithe, upon the 1st November 1869, and after that fire happened the Metropolitan Board of Works wrote the following letter to the company on the 9th of December 1869: "It has been reported to the Board that at the fire which occurred at Messrs. Campbell's cooperage in Trinity-street, Rotherhithe, on the 1st of November last, there was a very inadequate supply of water, and that there is not a sufficient number of fire-plugs in that locality, and the water that could be obtained was one jet of half an inch in diameter through 240 feet of hose, and one jet of an inch in diameter through 360 feet of hose; thus though six engines attended only two could be got to work, and I am to suggest to your directors the advisability of placing a few more fire-plugs in that locality.

4061. Did your company answer that letter?—The company answered that letter on the 22nd of December: "Dear Sir,—Your letter of the 9th instant with reference to the fire which occurred at Messrs. Campbell's cooperage in Trinity-street, Rotherhithe, on the 1st November last, and in which you state that your Board suggest the advisability of the directors of the Kent Waterworks Company placing a few more fire-plugs in that locality, has been submitted to them, and I have been desired by them to reply to it. I would, in the first instance, refer you to my letter of the 20th July, in which reference is made generally to the subject of the extinguishment of fires and the provision made by this company in regard thereto, and of which I have not yet received an acknowledgment. In that letter I referred to the relative duties of the public authorities and of the water companies. I now again beg to direct your attention to the 38th and following sections of the Water Companies Act, 1847, and the Metropolitan Fire Brigade Act, 1865." Those are the sections relating to the provision of fire plugs. "With reference thereto, and in answer to your letter, I have to say that this company

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company will have much pleasure upon the request and at the expense of your Board in placing any number of hydrants on their main in Rotherhithe, from which a constant supply of water can be obtained, independent of the company's turncocks, and Mr. Morris, the engineer of the company, has received full instructions to place the same in any position that may be indicated by your Board. I remain, dear Sir, yours truly, *Griffith Thomas.*" The facts relating to that fire are these: Along the street passing the premises on fire there was at that time an 8-inch main constantly charged, and the two plugs from which the water was obtained for this fire are situated on the end of the service pipes branching off from that main; the lengths of those service pipes would greatly exhaust the pressure available from the 8-inch main, and that would account for the supply not being so large as the Board would like to have had; a larger supply could have been given from the 8-inch main, and their engines could have been used had hydrants been placed upon the larger pipe.

4062. That is to say, that whilst the supply was deficient, from the causes you have stated, there was within a reasonable distance available water if hydrants had been placed upon the main to give it?—Yes, a much larger supply was available near by, if means had been there to take advantage of it.

4063. There was a fire, was there not, in 1872, at the Kamptulican Works in the Greenwich-road, at which a complaint was made as to the time before water was available?—Yes, a complaint was made of 15 minutes' delay in obtaining water. The company's turncock was not called, but he saw the fire, and water was obtained, according to his report, in 12 minutes from the time the fire broke out. The company's large main from Deptford to Woolwich passes along the Greenwich-road, and in front of these premises, and the attention of the Metropolitan Board of Works was directed to the fact, that, in this case, had hydrants been fixed on the main, an instantaneous supply could have been had without waiting for the turncock.

4064. Setting aside the discrepancies as to time, you would represent that there also, if hydrants had been properly fixed to the mains which did exist, an instantaneous, instead of a delayed supply could have been obtained?—Yes, an instantaneous supply, and a much larger supply.

4065. There was another fire in the same year, was there not, near the Foreign Cattle Market at Deptford, of which complaint was made also?—In October 1872 a fire occurred at a small wood yard near the entrance to the Foreign Cattle Market, and a complaint was made of the short supply of water; and the company in answer to the complaint, forwarded a copy of the report of the chief inspector of the company, who was in attendance at the fire, who stated the supply was good. The inspector's statement was vouched for by an inhabitant of the neighbourhood. It is customary that these statements should be signed by some inhabitant of the neighbourhood who knows the facts relating to the supply of water at a fire. A copy of that report was sent to the Metropolitan Board of Works, and the Board was reminded that an instantaneous supply of water was procurable without the assistance of the company's servants from the fire main of the adjoining cattle market, of which supply the fire brigade had availed themselves, and that the supply of water was continuous from various hydrants and fire plugs for nearly three days, and that about 2,000,000 gallons of water were drawn therefrom.

4066. That statement you sent in answer to the Metropolitan Board of Works' complaint, with reference to the want of water?—Yes; I have the letter here in which those facts are stated.

4067. And you represent that a supply of this magnitude was available during three days after the fire in putting out the remains of it; that the supply was continuous, and was given by hydrants, and the fire-plugs which were fixed at the time?—Yes.

4068. That was in October 1872; now since that date, have the company had any intimation from the Metropolitan Board of Works with regard to this point, or any fresh complaints as to any deficient supply of water, or the non-attendance of turncocks?—I think one communication was received from the Board in the course of last year, but until that date no complaint had been received from the Board either of late or non-attendance of the turncocks, or short supplies of water at fires. I should say that the directors in the meantime

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had made arrangements for five of the company's inspectors and turncocks to reside close to the several fire-brigade stations throughout the district.

4069. Was that accepted by the Metropolitan Board of Works?—That was an arrangement which was made without regard to the opinion of the Metropolitan Board of Works upon the subject. The directors thought that it was desirable, as conducing to the earlier attendance of turncocks at fires, that some one should live as near as possible to each fire-brigade station, so that when a call came he could go with the engines to the fire; that is the usual practice now, and it is found to work very well.

4070. I think we have it in evidence that the companies have been negotiating with the Metropolitan Board of Works requesting the Metropolitan Board of Works to allow the turncocks to live at the fire-brigade stations?—I believe a proposal to that effect was made by one of the water companies to the Metropolitan Board of Works.

4071. Which was declined by the Metropolitan Board of Works?—I have heard it was declined.

4072. Can you give any instances in which the turncocks live close to the station, carrying out that order of the company?—At the Deptford station one of the inspectors lives within 32 yards of the station; at Greenwich an inspector lives 51 yards from the station; at Blackheath a turncock lives 144 yards from the station; at Lewisham a turncock lives 231 yards from the station; that was the nearest convenient house he could find; at Woolwich a turncock lives 60 yards from the fire-brigade station.

4073. That practically in most cases brings the turncocks within the same distance as the men of the brigade; that is to say, the men who lodge out?—Doubtless. I do not know the distance at which the brigade men live from their work.

4074. At all events, it would require but a very few seconds to summon the men when a fire broke out?—Quite so; these inspectors and turncocks usually accompany the engines to a fire; it is part of their duty that they should remain at home between six at night and six in the morning, and five deputies are selected to relieve them two evenings in the week, and for these special duties the company pay their men extra money to the amount of 52 *l.* per annum.

4075. Therefore the company have themselves done what they could to obviate the difficulties which have been pointed out of the non-attendance of turncocks, whilst they suggested to the Metropolitan Board of Works on several occasions the advantages which would be derived from the establishment of a system which would render the turncock's attendance unnecessary?—The company have done everything which they found to be practicable in order to ensure the prompt attendance of the turncocks at fires.

4076. I think your attention was called to the proceedings of the Select Committee which sat in 1867, which dealt with the inquiry into the East London Water Companies' Bills, and to the evidence which was given before that Committee by Captain Shaw and Mr. Bateman the engineer, as to the plug system for the supply of water at fires?—Yes; showing the desirability of superseding the then existing plug system by the provision of constant supply, and hydrants on the pipes constantly charged.

4077. In dealing with that they represented the change as one which would be very advantageous, both in the interests of the public and as giving additional facilities also for working the brigade?—Yes, entirely so. I have here a copy of the questions and answers which were put to Mr. Bateman, in order to obtain his opinion of the relative merits of the two systems which have been referred to previously in the course of this inquiry.

4078. We may take it as a fact that Mr. Bateman in his evidence, as has before been stated, pointed out that the system of plugs which had been adopted was a system which I think he described as a "disgraceful mechanical invention, or something to that effect?—In his own words, "a disgrace to our profession," and "a disgrace to the mechanical ingenuity of the age that it should be allowed to exist.

4079. I think he also stated, in 1867, that he saw no difficulty in establishing a system of hydrants in London?—Yes; in answer to Question 2569, namely, "And with a system of constant supply, do you see any difficulty in introducing

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introducing a system like that in London?" he says: "None whatever; I cannot understand the estimates which have been made and laid before this Committee"; and then he goes on to the question of the cost of hydrants.

4080. Captain Shaw also, in his evidence before that Committee, was strongly of opinion that it would be an advantage to adopt a system such as has been suggested of constant supply, with hydrants affixed to it; in fact, bearing out the report which was forwarded to you by the Metropolitan Board of Works made by him?—Yes, Captain Shaw's evidence upon that occasion was entirely in accord with a report which he had made to the Board in 1866, and confirmatory in every respect of Mr. Bateman's evidence, in respect to the relative merits of plugs and hydrants.

4081. The Report of the Committee dealt with this question, and recommended very strongly an alteration in the system, so as to bring it into accord with the evidence which had been given by Mr. Bateman and Captain Shaw?—Yes. The Report of the Committee of 1867 contained this paragraph: "With regard to the ground of complaint respecting the plugs, it appears that it is chiefly, if not entirely, owing to the Metropolitan Board having had their attention directed to the most expensive mode of effecting their object, and your Committee have no doubt that as soon as the constant supply is in force and the Metropolitan Board applies its energies to providing the simplest and cheapest form of hydrant, instead of a common plug, they will be able, with some unavoidable exceptions, to throw the water directly from the company's mains, without the intervention of an engine, in sufficient quantity to arrest the progress of fires at their first outbreak."

4082. That Report was founded on evidence which was given as to the state of the water supply of London generally in that year?—It was.

4083. And that Report contemplated evidently, wherever mains were constantly charged, the application of the system of hydrants efficiently for the purpose of extinguishing fire?—I think undoubtedly so. With regard to this evidence of Mr. Bateman, I would beg leave to remark that Sir Joseph Bazalgette, in his evidence to the Committee last year, said that he agreed with Mr. Bateman in his evidence of the value of wooden plugs from his point of view, and Sir Joseph Bazalgette added, that if he were the adviser of the water companies he should certainly advise them to put down hydrants, but I think it may be borne in mind that Mr. Bateman's advice was not tendered to, or on behalf of, the water companies in the Committee of 1867, but that his opinion was elicited by the examination of the learned counsel for the Metropolitan Board of Works.

4084. Quite so. At that Committee witnesses were examined by counsel, and the Metropolitan Board of Works was one of the parties heard before that Committee, and this evidence was brought out by the learned counsel for the Metropolitan Board of Works itself?—Yes, apparently with the view of indicating the improvements which were desirable in the opinion of the Metropolitan Board of Works at that time.

4085. That is borne out also by the letter which you laid before the Committee just now, enclosing Captain Shaw's report, which was then evidently the feeling of the Metropolitan Board of Works?—Yes.

4086. At least that was the impression it left upon the companies' mind?—Yes; and that was the impression it apparently left upon the mind of the Committee of the House of Commons, judging from that paragraph of the Report which they made.

4087. Now dealing with the next inquiry, which was a Select Committee upon the Metropolis Water Bill of 1871, there was a good deal of similar evidence then gone into, was there not, with regard to an alteration of the system of plugs into a system of hydrants?—Yes. Mr. Bateman again gave evidence of a similar kind to that which he had given in 1867, perhaps not then at the instance of the Metropolitan Board of Works, but the evidence he gave was also confirmed by the evidence of the water engineers who were examined before that Committee, indicating that if constant supply were adopted, hydrants must of necessity accompany the adoption of constant supply.

4088. And that constant supply was a distinct thing then, and understood to be a distinct thing, was it not, from what has been called before this Committee

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"high-pressure supply"?—The constant supply then under the consideration of the Committee was a constant supply of water for the domestic purposes of the inhabitants.

4089. That which was then being inquired into by that Committee was not the question of whether you could get a greater pressure than the present companies have the power of giving, but whether instead of an intermittent supply as was then, and still is, in a great part of London the system in operation, you could not introduce a constant supply instead, and therefore when they recommended that hydrants should be placed upon the constant supply, what they had in their minds was the pressure which then existed?—The pressure which then existed for domestic purposes.

4090. The Committee came to a resolution which became the foundation of an Act, did they not?—Yes, to amend the Act of 1852 as regarded the introduction of constant supply; in the former Act constant supply was to be introduced upon the requisition of the consumers, and in the Act of 1871 it was provided that the Metropolitan Board of Works should have power to call upon the companies to provide a constant supply, or that the companies might on their own proposal to the Metropolitan Board of Works provide a constant supply, or that the Board of Trade might, if they pleased, require the companies to provide a constant supply in any part of their districts.

4091. And by Section 32 the word "hydrant" was introduced into the law?—Section 32 of the Metropolitan Fire Brigade Act, 1865, was to operate subject and according to the following provisions: The first sub-section was, that "In that section and in this provision the term 'fire-plug' and the term 'plug' shall include hydrant, and all other apparatus necessary or proper in connection with the company's pipes for supply of water in case of fire." The second was, "Where a company give a constant supply in any part of their water limits, they may, if they think fit, give notice thereof to the Metropolitan Board of Works"; and the third, that "If the Metropolitan Board of Works do not, within two months after receipt of any such notice, specify, as regards that part of the company's water limits, what plugs for supply of water in case of fire, at what places, of what dimensions, and in what form they require the company to provide; then, at any time after the expiration of that time the company may, if they think fit, provide in and for that part of their water limits such plugs for supply of water in case of fire, at such places, of such dimensions, and in such form as to the company seem necessary or proper." Then Sub-section 6 says, "The providing of plugs by a company under this provision shall be at the expense of the Metropolitan Board of Works, and the cost, charges, and expenses of the company in or about the providing of the same shall be paid to the company by the Metropolitan Board of Works on demand, out of their general rate, and in default may be sued for and recovered with costs by the company in any court of competent jurisdiction for the recovery of any ordinary simple contract debt of the like amount."

4092. That is what the companies look to as the law at present regulating the placing of hydrants upon their system of pipes?—Regulating the provision of hydrants upon all mains in a district under constant supply. That would not include perhaps all pipes under constant supply, because there may be many pipes under constant supply not situate in a district according to the interpretation of the Act in which constant supply is given.

4093. I understand the Act clearly to imply this: that where a company has given notice of placing a given area which they specify entirely under constant supply, then these sections come into operation; that if the Metropolitan Board of Works do not themselves specify where they wish the hydrants to be placed, then the company can place the hydrants, and can charge the expense to the Metropolitan Board of Works, recovering that expense from them?—Yes, in default of the Metropolitan Board of Works prescribing hydrants for any district under constant supply the companies may provide in that district what hydrants they think necessary in their own judgment.

4094. And the expense, by the 6th sub-section, is chargeable upon the Metropolitan Board itself?—It is.

4095. Now, after this new regulation was made under the Act of 1871, had you any requisition for constant supply from the Metropolitan Board of Works?—No, the company have never received any requisition from the Metropolitan Board

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Board of Works to place any part of their district under constant supply, but soon after the passing of that Act in 1871 it was thought desirable to ascertain some reliable facts relating to the introduction of constant supply in the metropolis, and with that view the company determined upon changing a portion of their district from the intermittent to the constant supply, and gave notice accordingly of their intention to the Metropolitan Board of Works.

4096. In what district was that?—The portion coloured purple of the parish of Rotherhithe, and including also a small part of the parish of St. Paul's, Deptford (*explaining the same to the Committee on the Plan*).

4097. The first process you had to go through was, I suppose, altering the house fittings in the district?—Yes, notices were served on the owners and occupiers requiring them to provide the prescribed fittings, and as soon as the alterations had been made in accordance with the notices, constant supply was given.

4098. As soon as the constant supply was given, did you apply under those sections of the Act to the Metropolitan Board of Works with regard to hydrants?—The company then applied to the Metropolitan Board of Works and asked for instructions for fixing hydrants upon the mains.

4099. The Act specifies, I think, two months as the time in which the Metropolitan Board of Works are required to give an answer?—Yes.

4100. Did they give an answer in time?—Before the expiry of the period of two months the Metropolitan Board of Works applied to the company for the withdrawal of the notice which we had given them of the provision of constant supply in the district.

4101. That was in the letter of the 28th of October 1873?—It was.

4102. Your notice having been served upon them in September of that year?—Yes; the letter was from Mr. Wyke Smith, the solicitor of the Metropolitan Board of Works, dated the 28th October 1873. I should say that Mr. Smith called upon me in reference to the matter, and I desired him to make the application in writing, that I might put it before the board of directors. The letter is as follows: "Dear Sir,—I will put into writing what I orally stated, namely, that it appears to the Metropolitan Board of Works that it may be advantageous if your company would be good enough to withdraw the notice you have given to the Board, under the 'Metropolis Water Supply Act, 1871.' The notice, you will remember, bears date the 17th September last. The Board feels that as regards your company, as well as others, there may be matters which will require time to investigate and decide on, and that to take time reasonably may rather forward than delay any steps. I therefore (as you suggest) formally on the part of the Board ask that the company will please to withdraw the notice as above, and of course this is to be without prejudice to the company giving any renewed notice as occasion might require. I am, dear Sir, yours faithfully, *W. Wyke Smith.*"

4103. Was that letter which was received from the Metropolitan Board of Works written with or without communication to the company; did the Board consult the company with regard to the extension of time before they wrote that formal letter?—No, that was the first application for an extension of time.

4104. That was their first answer to your notice of the 17th of September?—Yes.

4105. Did the company agree to that letter?—The company replied by a letter dated the 11th of November 1873, that they were unable to withdraw this notice.

4106. That threw it upon the Metropolitan Board of Works to complete, or it brought into existence the power of the company to do it themselves?—Yes, if the Metropolitan Board of Works had not prescribed within the two months what hydrants they desired the company to erect in the district, then the company could have proceeded with the erection of the hydrants if they thought necessary.

4107. Upon that refusal did the Metropolitan Board of Works proceed to indicate where they thought hydrants should be placed?—Yes, the Board then forwarded a requisition to the company directing the fitting of 30 saddle pieces upon the mains, and the erection of eight hydrants of different kinds upon those saddle pieces.

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4108. I think it is stated in the evidence that those eight hydrants of different kinds were for the purpose of experiments?—I apprehend so.

4109. Was that work carried out at once by the companies?—Yes, the work was executed, and application was made to the Board for instructions to erect hydrants upon the remaining saddle pieces which were not occupied.

4110. And were orders given with regard to those remaining ones?—Orders were ultimately given.

4111. We have heard that those hydrants were put down for the purpose of experiment, and it has been given in evidence that certain experiments took place?—Yes, they did.

4112. Were the company represented at those experiments?—On the completion of the erection of those eight hydrants, a deputation from the Metropolitan Board of Works, with Captain Shaw, came down to the district, and witnessed the results which were obtainable from the hydrants which had been put up. I was present upon that occasion with the engineer of the company, and saw the experiments which were then made. The hydrants each threw a jet of water which could have been used upon the adjoining buildings with effect, without the intervention of a fire engine.

4113. Were those experiments kept up any time so as to test the pressure, whether it was a continuous pressure?—The experiments were continued so long as the members of the Board desired them to be continued; they were not maintained for any very great length of time—a few moments' experiments at each hydrant.

4114. However, you imagine it was sufficient to satisfy the members of the Metropolitan Board of Works, who had witnessed the experiments?—Perfectly so. Captain Shaw expressed an opinion that the pressure which he saw on the gauge was a good pressure, and a sufficient pressure for their purposes.

4115. And as the result of those experiments the Metropolitan Board of Works, on your requisition for instructions with reference to completing the remaining saddle-pieces by fixing hydrants upon them, gave instructions for that purpose?—Yes, they ordered the erection of 19 of the 2½-inch ball hydrants.

4116. Are those Messrs. Guest and Chrimes' hydrants?—Yes, they are Messrs. Guest and Chrimes' ball hydrants. One of them has been brought into the room. The ball hydrants erected upon the Kent Company's district are a little different from those which are erected at Manchester in this respect. At Manchester I think the orifice for the delivery of the water is 2 inches, and those we have erected have an orifice of 2½ inches.

4117. Do you mean that these ball hydrants were the same as those which you saw exhibited by the last witness, in which one standpost can be used for any number of boxes?—Yes, the hydrants of that kind where one stand-post will apply to a great number. (*The Witness produced a sample hydrant, and described the action of the valve.*)

4118. In fixing those, were they fixed with the standposts attached to each one of those hydrants, or were the boxes fixed and the standposts supplied as required by the Board?—The standposts were supplied separately; the hydrants were fixed in the boxes, and eight standposts were supplied.

4119. Can you give the cost of putting this district under this system?—The company's expenses in the matter amounted to 202 *l.* 19 *s.* 4 *d.*

4120. What average would that give per hydrant?—An average of 6 *l.* 15 *s.* 4 *d.* That sum does not include the cost of the hydrant which was furnished by the Metropolitan Board of Works, which is known as Captain Shaw's hydrant; the cost of that valve was 12 *l.*

4121. That refers to one of those which were put down for the experiment?—Yes; the cost of these experimental hydrants is included in the 202 *l.* 19 *s.* 4 *d.*, with the exception of the 12 *l.* and 7 *l.*, being the cost of two hydrants which were placed there by permission of the Metropolitan Board of Works at the request of Messrs. Stone.

4122. Can you give the Committee the various prices of the hydrants respectively?—With regard to the experimental hydrants, No. 1, known as Captain Shaw's hydrant, the expense attending that hydrant amounts to 18 *l.* 13 *s.*; No. 2, which is Messrs. Guest and Chrimes' frost-valve, the expenses were 8 *l.* 3 *s.*; No. 3, the 2-inch ball hydrant, the expenses were 4 *l.* 15 *s.*; No. 4, Stone's horizontal sluce-valve, the expenses were 7 *l.* 19 *s.*; No. 5, Stone's 2½-inch screw-down

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down hydrant, the expenses 6 *l.* 15 *s.* 6 *d.*; No. 6, Messrs. Guest and Chrimes' loose valve, 7 *l.* 9 *s.*; No. 7, Messrs. Guest and Chrimes' 2½-inch ball hydrant, 4 *l.* 15 *s.* 6 *d.*; No. 8, Messrs. Guest and Chrimes' 2½-inch screw-down hydrant, 6 *l.* 2 *s.* 6 *d.*; No. 9, Messrs. Guest and Chrimes' 2½ ball hydrant, costing to erect 2 *l.* 19 *s.* 9 *d.*

4123. Which was the one that was adopted after those experiments were made of different kinds of hydrants?—Messrs. Guest and Chrimes' 2½-inch ball hydrant, at a cost of 4 *l.* 15 *s.*; No. 10, Messrs. Guest and Chrimes' sluice hydrant, 8 *l.* 13 *s.* 10 *d.*; No. 11, Lambert's diaphragm, costing 5 *l.* 8 *s.*

4124. By the original order of the Metropolitan Board of Works, whilst they ordered 30 saddle-pieces they only ordered eight hydrants, but they subsequently ordered more?—Subsequently they gave an order for the erection of Messrs. Guest and Chrimes' 2½-inch ball hydrants.

4125. You have given the Committee 11 different hydrants, so that originally the Board sanctioned experiments being made with more than you have at present stated?—Quite so; I have stated that the Board gave permission for two extra, and the total number put on was 11.

4126. Mr. *Stewart Hardy.*] There are now 11 different hydrants within a short distance of one another; how can the fire brigade use them?—They can all be used with equal ease, because the fire brigade have the appliances for opening them.

4127. Does one appliance open them all?—No; the standpost opens the ball hydrant and the keys open the valves of the other hydrants; that there is no difficulty in dealing with these different hydrants is shown by the fact that kinds kinds have been used at one fire since they were erected.

4128. *Chairman.*] The Metropolitan Board having sanctioned the placing of this Guest and Chrimes' ball hydrant on the remaining 19 saddle-pieces, can you give the Committee the amount it would have cost your company to have put down the whole 30 of that description?—If we may take the expenses of erecting the 2½-inch ball hydrant at 4 *l.* 15 *s.*, as being indicative of the conditions which would have prevailed throughout the district, then it would have been 142 *l.* 10 *l.*, or a little over.

4129. What I understood you to say when you were giving us the figures was that the cost of those 30 hydrants amounted to 202 *l.* 19 *s.* 4 *d.*, plus the amount of extra work which you have described, that is to say, 19 *l.* odd?—Yes.

4130. That was for 30 hydrants, of which 10 were of a different description?—Yes.

4131. What reduction would be made if those 10 had been of the same pattern as the ones which were subsequently put down?—I have not those figures before me.

4132. But still 6 *l.* 15 *s.* 4 *d.*, which is the average, would not have been reached; it would have been a smaller average per hydrant?—Certainly, if they had all been ball hydrants in the first instance; the Committee will gain some knowledge of the cost of these ball hydrants from the subsequent proceedings of the company in another district which was put under constant supply.

4133. At all events, the Metropolitan Board, from experiments made, have selected this hydrant which costs upon the average at that particular part of the town less than 6 *l.* 15 *s.* per hydrant?—They selected the hydrant which cost, as I stated, 4 *l.* 15 *s.* in two cases, and in one case cost less, namely, 2 *l.* 19 *s.* 9 *d.*

4134. I wish only to illustrate what the Metropolitan Board did when they were compelled to put down hydrants in a given district of the town?—Quite so. I think the cost of these ball hydrants has been referred to in previous evidence. In comparing the difference in price between London and Manchester it was pointed out that in Manchester many of those hydrants were put down at 2 *l.* 15 *s.*, and that in this district the hydrants cost 4 *l.* 15 *s.*; the hydrants which I have just referred to as costing 2 *l.* 19 *s.* 9 *d.*, which comes very close to the Manchester figures, was placed in the roadway at the end of one of the pipes, and did not require the saddle-pieces, which makes a great difference in the cost.

4135. If you could adopt as suggested by the last witness a system under

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which the hydrants would be fixed on mains in the middle of the roadway, as they do at Manchester, the cost which we have been talking about would be reduced, would it not?—It would be reduced no doubt, but it is a question whether it would be advisable.

4136. But at all events the cost might be reduced in places in which there would be an advantage in doing it, by fixing the ball hydrant upon the mains in the middle of the road instead of going to the further expense of carrying the connecting pipes from the main to where you placed your hydrant, close by the footway?—It would depend upon the circumstances. The difference in the cost of these two has resulted, as I have explained from the first, that in one case the hydrant was put upon the main, which required a saddle-piece, whereas in the other case it was put at the end of the pipe where the saddle-piece was not required. Many of these hydrants, I should say, were fixed in the roads.

4137. Then whilst these negociations were going on, did the company proceed in the way of extending their constant supply to other districts beyond these?—Yes, notice was given of the company's intention to provide a constant supply in the Plumstead portion of their district.

4138. Did you issue notices first to the district?—The usual notices were issued and the alterations were effected; and upon the constant supply being given, notice was given to the Metropolitan Board of Works.

4139. On what date was that notice given?—On the 8th of September 1874.

4140. Did the Metropolitan Board then give instructions with regard to affixing of hydrants within the two months?—They did not specify within the two months prescribed in the Act what hydrants were to be erected, and their attention was drawn to the absence of these instructions, and the same day on which the company's letter was forwarded a reply was received from the Board through their solicitor, stating that it had been necessary to refer the matter to the engineer and Captain Shaw, and that on the Board receiving their report they would no doubt communicate with the Kent Waterworks Company

4141. You got that reply practically asking for a delay beyond the two months; was anything done upon that?—No; the subject was then allowed to stand over for more than 12 months, and no communication having been made by the Metropolitan Board to the company, a letter was sent on the 1st of December 1875, asking if the Metropolitan Board were not prepared to specify what hydrants they required to be placed upon the mains in the district.

4142. In that letter you pointed out to the Metropolitan Board that a constant supply was then being given?—I will read that letter if you will allow me: "I am directed to call the attention of the Metropolitan Board of Works to the company's notice of the 8th day of September 1874, that a constant supply of water was then being given in the district in Plumstead, described in the company's notice to your Board of the 28th October 1873. On the 24th November 1874, I drew the attention of your Board to the fact that no instructions had been received by the company with regard to the affixing of hydrants upon the mains in such district, in accordance with Section 32 of the Metropolis Water Act, 1871, and upon the following day I received a letter from Mr. W. Wyke Smith, the solicitor of your Board, stating that 'with reference to your company's notice, that a constant supply of water is now given in the district of Plumstead, it has been necessary to refer the subject to the engineer and Captain Shaw, and on the Board having their report they will no doubt communicate with the West Kent Waterworks Company.' As no communication has been made to the company upon the subject during the 12 months which have since expired, my directors instruct me to ask if the Metropolitan Board of Works are now prepared to specify, as regards that part of the company's water limits, what plugs for the supply of water in case of fire, at what places, of what dimensions, and in what form they require the company to provide. In accordance with the section of the Act before mentioned, I transmit to you herewith notice that the company give a constant supply of water in four other parts of their water limits, and am also to ask for the instructions of your Board for fixing hydrants upon the mains in the additional districts therein referred to."

4143. Was an answer sent to that letter by the Metropolitan Board?—On the 14th December 1875 this letter was received from the Metropolitan Board

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of Works: "Dear Sir,—I have laid before the Board your letter of the 1st instant, in which you call attention to the notice by the Kent Waterworks Company of the 8th December 1874, and inquire whether the Board are now prepared to specify what plugs they require the company to provide, and with which you also transmit a notice that the company are giving a constant supply in four other parts of their water limits. In reply, I am directed to acquaint you, for the information of the company, that the whole question of providing hydrants in the metropolis is now under consideration by a committee of the Board, who are inquiring fully into the subject, and have visited Liverpool and Manchester for the purpose of inspecting the arrangements existing in those places for extinguishing fires by means of hydrants. The report of the committee will shortly be considered by the Board, and upon a decision being arrived at they will, no doubt, direct that a definite reply shall be sent to your letter. Under these circumstances the company will probably think it expedient that the matter, both as regards the notice of the 8th September 1874 and the one which you now transmit, should be postponed until the report above referred to shall have been dealt with by the Board, and the committee have directed me to address this communication to you with that view."

4144. That was an application for a further postponement, they already having had 14 months or more since your first intimation of the district being under constant supply?—Quite so.

4145. Did the company take that letter into consideration, and what answer did they make to it?—The company fully considered the matter, and upon the 15th of January 1876, by order of the directors, I addressed the following reply to the Metropolitan Board of Works: "The Board of Directors of the West-Kent Waterworks Company have had under consideration your letter addressed to me of the 14th ultimo, in answer to mine of the 1st ultimo, with reference to the providing of plugs for the supply of water in case of fire in the additional district placed by them under constant supply, and specified in the company's notice to the Board of the 8th September 1874, and in which letter you suggest a postponement of the matter until after the report of a committee of your Board upon the whole question of providing hydrants in the metropolis shall have been considered by your Board, and a decision arrived at. In reply, I am desired by the directors to remind you that the Metropolis Water Act, which cast the duty of providing hydrants upon your Board, was passed so long since as 1871; that this company on the 17th September 1873, gave notice of having placed a part of their limits, comprising portions of Rotherhithe and Deptford, under constant supply; that in August 1874 your Board, after certain experiments, under the advice of Sir Joseph Bazalgette and Captain Shaw, caused approved hydrants to be fixed on the mains in that part of their limits; that the company afterwards placed other parts of their limits comprising Plumstead under constant supply, and gave to your Board the notice thereof (the 8th September 1874) before referred to. Now, in view of these facts, and particularly that more than 15 months have elapsed since the 8th September 1874, and that hydrants have not yet been fixed to the mains in the districts described in the notice of that date, and the great importance to the public of the existence of means for the extinguishment of fire, the Directors of the Kent Waterworks regret that they cannot concur with your Board in the expediency of postponing the matter for so uncertain a period as that indicated in your letter; and I am therefore desired by them to say that they intend to exercise the powers conferred upon them by the Act, and with all convenient dispatch to provide in accordance therewith upon the mains in that part of their limits comprised in the notice of 8th September 1874, such plugs or hydrants for the supply of water in case of fire as to the company shall seem necessary, and that they will require your Board to pay the costs, charges, and expenses thereof. The directors have caused a plan of the mains in such district to be prepared, with the places at which they propose to fix the hydrants shown thereon, of which I transmit you a copy, and they will give due consideration to any suggestions your Board may make in relation thereto; and I may add that they purpose causing the same description of hydrants to be fixed as that which was adopted by your Board in the Rotherhithe and Deptford districts."

4146. There they had a distinct intimation on the part of your company that they proposed to enforce the section of the Act of 1871, having themselves com-

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pleted the obligations thrown upon them under the Act, and having called upon the Metropolitan Board to complete, and failing their having so completed, carrying out the 6th sub-section of the 32nd section of that Act, which allows them to do it themselves, and throws the cost upon the Metropolitan Board?—Yes, carrying out the sub-sections of the 32nd clause.

4147. Now that issue having been so distinctly raised, what answer did you get upon that from the Metropolitan Board?—The company received the following letter from the Metropolitan Board, dated the 26th January 1876. "Dear Sir,—The Metropolitan Board of Works have considered your letter of the 15th instant, and are quite unprepared to assent to the view taken by the Kent Waterworks Company, that they can without reference to the actual circumstances, and in the absence of the assent of the Board provide (as proposed by the company) upon the mains in that part of the company's limits in the letter referred to, such plugs or hydrants for the supply of water in case of fire as to the company shall seem necessary, and that they will require the Board to pay the costs, charges, and expenses thereof. The Board, after much examination and reflection, are satisfied that under the existing circumstances the providing of the plugs or hydrants as proposed will not be desirable, that there is no need for them in that locality, and that they would not be advantageous to the Board or the public, nor would the expense attending them be profitably incurred. The Board therefore hope that the company will not proceed further in the matter, and I am directed to intimate to you that if the company should take such steps as are indicated by your letter of the 15th instant, the Board will be compelled to treat them as unduly taken, and without legal sanction, and you will be pleased to receive this as a distinct but courteous protest against the measures which the company have in their letter alluded to. I am, dear Sir, yours faithfully, *J. E. Wakefield*, Clerk of the Board."

4148. That letter is a distinct intimation that the Metropolitan Board set aside the Act of 1871, as you interpret it?—Quite so.

4149. And thus as regards the intention of both the Report of the Committee upon which the Act was founded, and those who put the clause in that Act, they deny that it has become a legislative enactment binding upon them?—That letter I apprehend practically denies the power of the company to put up hydrants in the district under constant supply, if the Metropolitan Board do not think it necessary or expedient to prescribe any for that district.

4150. Notwithstanding the express terms of the Act of Parliament the Metropolitan Board, acting under advice, deemed that Act inoperative, and determined that the sanction of the Board must still be obtained before the companies can carry out the directions of the Act?—That appeared to be their view of the subject, from their saying that if the steps announced by the company were taken the Board would have to regard them as being unduly taken and without legal sanction.

4151. They, under advice, have set aside the construction which has hitherto been put upon the Act of 1871, and which the Board themselves admitted to be the proper construction, when they allowed your first notice with regard to Rotherhithe to be operative, and when they, within a given time, agreed to do what you requested, namely, to specify the places for certain hydrants to be put down?—Yes, up to this point.

4152. What did your company do in consequence of that letter?—The company proceeded in accordance with their announced intention to erect hydrants in the district, under constant supply, in Plumstead, at the places shown upon the plan which accompanied their letter.

4153. They proposed exactly to carry out the plan which they submitted to the Metropolitan Board as the plan which they should adopt, in case the Metropolitan Board did not themselves give instructions for the work?—Yes; the work has been carried out in accordance with the plan which accompanied the letter.

4154. Have any number of hydrants been fixed in consequence of that intimation?—Sixty hydrants have been fixed in consequence of that intimation.

4155. Are those completed?—Yes, the work is completed, and a letter was sent

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sent from the company informing the Metropolitan Board that the work had been completed, and enclosing a bill of the costs, charges, and expenses of the company in and about providing the hydrants, and the Metropolitan Board have paid the company's costs of providing those hydrants.

4156. Do I correctly understand you to say that your company, having carried out the plan which they had submitted, and on which the letter was written to the Board, received on application for the costs of putting down those hydrants, those costs from the Metropolitan Board?—The company have received payment of their costs from the Metropolitan Board.

4157. Sir *Henry Peek.*] In full?—Yes.

4158. *Chairman.*] That payment is a distinct intimation on the part of the Board that the letter of the 26th of January 1876, was written under a false impression of the law?—I regard the payment of those costs as being tantamount to a withdrawal of the protest which was made in the letter to the company.

4159. Those 60 hydrants, and what you have been now describing, refer to the Plumstead district, do they not?—Yes.

4160. I understand your letter to the Metropolitan Board which you have quoted here, to imply that there were other districts which you were going to bring under constant supply subsequently to the Plumstead district, and for which you had given constant-supply notices?—Yes; other portions of the parish of Plumstead.

4161. The plan with regard to the hydranting of those districts has not been settled yet, I believe?—No, the company has not taken any further steps pending the investigation of this Committee.

4162. You have issued your notices with regard to bringing these districts under constant supply, have you not?—We have in three cases.

4163. You mean that you have not proceeded to give the constant supply pending the decision of this Committee?—We have given the constant supply, but we have not proceeded to put in operation the Sub-sections of Section 32, beyond notifying to the Metropolitan Board that those districts are under constant supply.

4164. You have not notified to the Board that they were under constant supply with the view of the Board's complying within the specified two months with the provisions of the sub-section of the Act?—We have given them notice in order that they should be in a position to prescribe hydrants for that district, but they have not as yet prescribed any.

4165. Have the two months elapsed?—Yes.

4166. Do your company propose to follow the same course as they adopted with regard to the first section of the Plumstead district, and to place the hydrants there themselves, charging the cost to the Board in the same way?—The matter has not yet been considered with the view to a determination, but I apprehend my company would follow the same course. The Metropolitan Board may, perhaps, deem it desirable that a different kind of hydrant should be erected throughout the metropolis from that which has been erected in that district.

4167. But what I want to arrive at is this: there is nothing to indicate that your company are not prepared to go on in the same course in carrying out the Act of 1871, as they adopted with regard to the Plumstead district?—Certainly not. I apprehend that my directors would proceed to put the provisions of this Act in operation in the second district as they did in the first.

4168. Now with regard to the fixing of the 61 hydrants, will you give the distances apart at which those hydrants were erected?—Generally speaking they would be 200 yards apart, but in some cases, where a greater advantage would arise from their being a little less distance apart, they have been so placed, as, for instance, at the junction of two or more streets.

4169. But with the knowledge which you have of your district, do you think that 200 yards is the distance at which they ought with advantage to be placed?—I should say that in selecting this distance we have followed the prescription of the Metropolitan Board of Works with regard to the distance in the Rotherhithe district, where we were required to provide hydrants.

4170. Are the two districts similar in their characteristics with regard to the

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density of the population and the size of the buildings?—In the Rotherhithe district there are larger warehouses, and larger premises, than would be found in the Plumstead district; where the hydrants have been put up in the Plumstead district, they are principally residences and small shops.

4171. In the Plumstead district you have followed the course which you adopted in the Rotherhithe district, and given greater facilities than might have been necessary, when you compare the different risks?—I think I may say, that in the Plumstead district we have put them at the same distances as those prescribed by the Metropolitan Board of Works for the Rotherhithe district.

4172. But you stated that the Rotherhithe district was more populous, or contained a larger amount of buildings requiring protection, than the Plumstead district?—I cannot say the district is more populous; there are very few houses comparatively in Rotherhithe, but there are large warehouses abutting upon the river, and also upon the main street which runs up from Deptford to Rotherhithe.

4173. You think there is sufficient similarity to justify the distances being equal in both cases?—Yes, I think so.

4174. In the evidence that we have had from one of our witnesses, it was stated that 180 feet was the proper distance, instead of 200 yards?—In this case the hydrants were prescribed by the Metropolitan Board of Works to be put down at distances of 200 yards, and less than 200 yards. I can show the Committee the plan which accompanied the requisition of the Metropolitan Board of Works for the hydrants in the Rotherhithe district. (*The Witness produced a plan and explained it to the Committee.*) With regard to the proximity of them, I think that is a matter which I must leave to the Metropolitan Board of Works to determine whether those distances are sufficiently short; they have prescribed that distance, and it is for them to determine the question.

4175. We have conflicting evidence as regards the distance, some prescribing 200 yards and others prescribing 60 yards?—That is the case.

4176. Therefore, if that 200 yards which has been carried out in your district were to be carried out in the rest of the metropolis, the cost of hydranting the whole of London, which has been calculated upon a much less distance, would be materially diminished?—It would be very much diminished, I think, taking the whole length of roads and streets which have been hydranted under the Metropolis Water Act, 1871, in the Kent Waterworks Company's district there would be about 11 miles, and I think there are about 91 hydrants upon the 11 miles. I now produce a copy of the plan which was submitted to the Metropolitan Board of Works, showing the places at which the Company proposed to put down hydrants in the Plumstead district (*handing the same to the Committee*).

4177. And you have followed the same distances as you had prescribed for you by the Metropolitan Board of Works in the Rotherhithe district?—The extreme distance of 200 yards in the first requisition has not been exceeded in this case, but in many cases the distance has been lessened by putting hydrants at the corners of the streets to make them available in one or more directions.

4178. I understood you to state, I think, that the hydrants you had placed in the Plumstead district were of the same kind as those placed in the Rotherhithe district?—Yes, Messrs. Guest and Chrimes' 2½-inch ball hydrant which the Metropolitan Board of Works prescribed for the rest of the 19 saddle-pieces.

4179. Can you give the cost of putting them down in the Plumstead district?—Yes, the hydrants in the Plumstead district have been placed in the footpaths and not in the roadways as in Rotherhithe, and have been placed as near the lamp-posts as possible, so that light may be had to work in, if they are used at night, and placing them in the footpath of course renders necessary a branch from the main to the hydrant on the path, and that somewhat adds to the cost of the hydrant as compared with what it appears to be at Manchester; the cost of those 61 hydrants in the Plumstead district was 204 *l.* 3 *s.* 6*d.*, giving an average of 3 *l.* 6 *s.* 11 *d.* per hydrant.

4180. Was that the cost of the hydrant and the fixing?—That was the cost of the hydrant, box, cover, and top, branches, collar, fittings, labour, material used, cost of supervision, and paving.

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4181. In fact the total cost where you fixed them, not in the middle of the road, but on the sideway, with the expenses which you incurred in consequence of the branches amounted to 3 *l.* 6 *s.* 11 *d.*?—Yes.

4182. Did that include the standpost?—No, the 204 *l.* 3 *s.* 6 *d.* does not include the standposts.

4183. It is not included in the average of 3 *l.* 6 *s.* 11 *d.*, that includes only the boxes and the breaking up of the roadway and refixing?—Yes.

4184. But in addition to that must be taken the cost of the standpost, of which you supply a certain proportion; how many did you supply in the Plumstead district?—Eight were supplied to the Metropolitan Board of Works in the Rotherhithe district, but I think it is estimated that the cost of one of those standposts would be about 2 *s.* 6 *d.* to each hydrant; the standposts cost 3 *l.* 12 *s.*

4185. You would have one standpost to about 27 boxes?—Yes; say 30 in round numbers.

4186. But surely that one would hardly be sufficient if you carried out the idea which has been suggested to this Committee, that the police should be able to use these hydrants for the extinction of fire before the arrival of the fire brigade, because if you applied one standpost to 26 or 27 of these boxes it would be more than a mile that you might have to fetch the standpost?—Doubtless in that case the number of standposts would have to be increased, and the increase would be spread over the total number of hydrants in the district; it would not greatly add to the cost of the hydrants, I apprehend; it would depend upon the number of stations which it was determined to use, or where those standposts were to be kept.

4187. That you might by grouping the boxes round the stations make one of the standposts available for a considerable number, though not perhaps for so many as that?—Quite so.

4188. That would increase slightly or perhaps considerably the expense of the average cost as you have given it for the Plumstead district?—Quite so. May I say upon that point, that in the Rotherhithe district a considerable proportion of the expense was incurred in putting pitching round the hydrants in the roads; in Plumstead that expense is obviated, and the only charge in the Plumstead district is 4 *s.*, which is made by the district authority for repairing the opening in the tar pavement. In the Rotherhithe district, the estimated cost of paving for those hydrants varies from 1 *l.* in one case to 1 *l.* 16 *s.*, and 2 *l.* 1 *s.* (that was for a brick chamber also besides the pitching), 2 *l.* 5 *s.* 6 *d.*, 2 *l.* 2 *s.*, 2 *l.* 17 *s.* 6 *d.*, and 1 *l.* 19 *s.* 6 *d.*, so that the Committee will see that there is a great difference between the cost of the hydrants in the Rotherhithe and Plumstead districts owing to their being in one case placed in the roadway, and requiring to be backed up with expensive pitching, and in the other case being placed upon the pavement, when the expense of insertion was not great.

4189. Therefore, in that case, the greater cost which is implied in the branch from the main and other additions which have been put before this Committee is reduced; that is to say, your fixing is reduced in that proportion?—The fixing is reduced in that proportion.

4190. And there is not the same economy as has been suggested to us by placing them in the roadway?—To that extent there is not. I may add also this, that at Manchester, I believe, the hydrants are fixed in the roadways, which to a great extent are covered with pitching, and which forms a great support and protection to the boxes; whereas in a large portion of the Kent district, if pitching were required, it would have to be provided at first cost.

4191. And that would make a difference in the cost here?—That would account for a large portion of the difference between the two prices which were referred to as the cost of these ball hydrants in London and Manchester, as between 2 *l.* 15 *s.* and 4 *l.* 14 *s.* It is desirable that those hydrants which have standposts to them, or which require standposts to be used in connection with them, should be placed in the pathways, because if the roadways are narrow the standpost is likely to be damaged by passing traffic, or even by the movement of the brigade engines.

4192. Of course the advantages are great in getting them to the sideway, and the only question is the question of expense; and you represent that, in

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consequence of the pitching which is required in the middle of the roadway in many parts of your district, that expense is not so very much increased by placing them by the sideway ?—Certainly not.

4193. An honourable Member wishes me to ask you would there be any possibility of saving the cost of those standposts by applying the hose directly to the box in the way in which the standpost is applied ?—The hose could not be applied to a ball hydrant without the intervention of a standpost.

4194. Because a cup is required for forcing the ball down, and therefore giving the flow of water ?—Yes; the standpost in reality is the means of opening the ball hydrant.

4195, Would that be the case with regard to the other form of hydrant in which the key turns the water on ?—The key for opening sluice-valve hydrants is not an expensive thing.

4196. Could you apply the hose directly to a sluice-valve hydrant ?—Yes, it could be screwed on direct to the orifice in the box, and would not require a standpost.

4197. That would reduce proportionately the cost of that hydrant ?—In the cost which I have given to the Committee of other hydrants than the ball hydrant there is no proportion of the cost of the standpost included, except in the case of one, because the standpost is not needed. I may say that I think experience has shown that even with the use of hydrants in the Rotherhithe district the standposts are liable to damage in the way that I have indicated, as two standposts have been damaged by a fire engine coming in contact with them, whereas if they had been in the pathway that probably would not have occurred.

4198. Now can you tell the Committee your experience with regard to any experiments which you have seen made in your own district in the use of those hydrants ?—I have seen a great many of them in experimental operation, and in my humble opinion they generally represent, to use the words in which Mr. Bramwell has before this Committee described the relative merits of the hydrant, as compared with the plug, "the principal and important" use of the hydrant, where they may be applied in the extinction of fires without engines.

4199. That relates to the hydrants which have been put up by the company ?—Yes, that relates to the hydrants which have been put up by the company.

4200. In all the experiments which you saw, was the pressure sufficient to throw a jet of water over the houses ?—In all cases it was so.

4201. Is the pressure which you give in your company's district a continuous pressure throughout the day that you can rely on, or is it an intermittent pressure fluctuating with the draught upon it for the domestic supply; that is, upon your constantly charged mains ?—The pressure given by the company throughout this constant supply district is a regular pressure, and one which may be always relied upon to a certain extent, and the only way in which it varied from the night pressure would be in the day, during the few hours when the intermittent services are open in connection with those mains.

4202. In those cases, I suppose you could not do away with the use of engines ?—Cases no doubt would arise in very large fires, or in different parts of the district where the elevation is considerable, where the power of the pressure applied to a hydrant might not be sufficient for all purposes, and then, as at Manchester and Liverpool, the engines would be required.

4203. But you would gain all the additional advantages of being able to use the water without the engines in most cases, and in all cases before the engines came ?—Quite so; you would be able to extinguish a fire in a large number of cases; and in all fires there would be the advantage of the attendant economy of water.

4204. You mean on account of the diminution of waste ?—Yes, and the wages of the persons assisting to pump, and in the wear and tear of engines, and in the regularity and continuity of delivery, and the presence of the turncocks would not be found to be a matter of such moment as in the case of a supply from the plugs.

4205. I suppose that if all your system of mains were under constant supply the presence of the turncock would practically not be required at all ?—Not as a turncock, except in cases in which it was required by the fire brigade to concentrate

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centrate the supply in any particular portion of the district, then it would be necessary that some turncock should regulate the valves in order to regulate the flow of water in that portion of the district.

4206. Even in your constantly charged district?—Yes, if it were desired to concentrate the supply to that part.

4207. In your constantly supplied district they could shut off one main and throw a greater body of water into a particular supply?—Yes, if any body of water were required to be concentrated in one district the means of concentration exist, and the services of a turncock would be required to direct the flow.

4208. I do not think that the evidence before the Committee has shown that any great number of fires have occurred in your company's district?—The number of fires in the company's district is not very great, as was pointed out by the Deputy Chairman of the Board of Works General Purposes Committee in his evidence. I said just now that there would be a great advantage arising from the adoption of these hydrants in the prevention of waste of water. One witness referred to this matter as being a company's question, but I think it is also a fire-brigade question to a very large extent, because whatever waste of water you have is so much waste of power of controlling the fire. I happened to be at a large fire which occurred last year at Brooks' Wharf, and I noticed there at one plug near which I was standing for a long time a tremendous waste of water. The steam fire-engine which was taking its supply from that plug was not able to utilise anything like the body of water which came from it, and as Mr. Greaves described it in his evidence, it was flowing away down the gutter.

4209. In fact, all that power for extinguishing fire would be saved if the system of hydrants were established?—Quite so.

4210. Now can you give the Committee an account of your reservoirs, and the pressures which your company give; I think you stated in an early part of your evidence that your district was divided into what is described as "zones"?—I can point out the "zones" upon the map. The light blue tint represents the low-level "zone," which is supplied from the reservoir in Greenwich Park at 160 feet elevation from the New Cross Reservoir at a similar elevation, and from the Plumstead Reservoir at an elevation of 170 feet. The dark blue tint shows the district which is supplied from the Woolwich Common Reservoir at an elevation of 250 feet above Ordnance datum, and the green portion is that supplied from the reservoir on Constitution Hill at 314 feet elevation. There is another reservoir at Chislehurst which is outside the metropolitan area.

4211. Does that supply any part of the district within the area?—No; it is for the supply of the district outside the metropolitan area. I may say that the portions of the map coloured purple are the districts which have been placed under constant supply.

4212. Now with regard to these pressures, are they pressures by gravitation?—Yes; during the night they are entirely pressures by gravitation, and during the day they are pressures by gravitation maintained by the pumping of the engines.

4213. Does the pumping of the engines cease during the night time?—Yes; the engines do not work during the night.

4214. Then you are dependent during the night upon the quantity of water which your reservoirs contain?—Yes.

4215. Can you give those quantities to the Committee?—The Greenwich Reservoir contains a million and a quarter gallons; the New Cross, a million and three quarters; Plumstead, 750,000; Woolwich Common, 1,600,000; and Constitution Hill, which is a small reservoir, 325,000 gallons.

4216. Those are all that deal with the metropolitan area?—Yes; besides those there are auxiliary reservoirs at the Deptford works, which contain 2,000,000 gallons.

4217. That is the supply which by gravitation you depend upon in each district for a fire during the night?—Yes; the supply in each district, with the exception of the Deptford auxiliaries, which would require pumping through the main.

4218. I suppose upon a fire breaking out you can set your pumping engines at work at once to keep up the supply in the reservoirs?—Certainly.

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4219. Is there any power of connecting your different supplies together, so as to utilise the greatest pressure which you have got by gravitation?—Yes; the pressure from the higher level reservoir might be let down into the lower level district if it were absolutely necessary, but I believe in the opinion of the company's engineer it would not be a prudent proceeding.

4220. Is it his opinion that it would tax the pipes too much?—In his opinion it is undesirable to subject the pipes to such a greatly increased pressure when they have only been accustomed to the lower pressure; there may be such conditions in the main as might render it ineffective if subjected to a severe pressure which would not show themselves under a lower pressure.

4221. That practically, in his opinion, would prevent any increase being given of your existing pressures for the purpose of the supply for extinguishing fire?—The pressure from the higher reservoir could be utilised if the fire brigade requested it to be done.

4222. In the opinian of the engineer of the company it would not be judicious?—It would not be a prudent thing to do.

4223. Therefore you are limited during the night to a gravitation of 160 feet, minus the difference in the height which the place may be in the Greenwich district, and the same in the New Cross district, and to a gravitation of 170 feet in the Plumstead district, whilst you get in Woolwich and the Constitution Hill reservoirs 250 and 314 feet respectively?—The pressure at night would be about equal to the difference between the level of the premises on fire and the level of the reservoir as more or less affected by the draught of water.

4224. Are your levels very varying in that district?—They do not vary very much in the lower districts, nor even in the upper districts, according to the height by which they are commanded.

4225. What is your prescribed pressure under the Act?—In the constantly supplied districts the pressures shall be such as will make the water reach to the top storey of the highest houses in the district, not exceeding at a greater elevation than 180 feet above Trinity high-water mark.

4226. Then, practically, your gravitation power really represents the difference between the height of your reservoir and the height of the houses in the district above Trinity highwater mark, and that is the jet which would be useful for the purpose of extinguishing fire?—Throughout the greater portion of the district the pressure would be sufficient to give a jet which could be largely utilised for the extinguishment of fire without engines.

4227. I understand that what you have just stated was the Parliamentary pressure which you are obliged to give?—Yes.

4228. Certain arrangements are made by your company, are they not, with the Government as to the supply of certain Government establishments?—In 1844 the Government were desirous of providing a supply of water under sufficient pressure for the protection of property at Woolwich and the Royal Dockyard, the Victualling Yard at Deptford, and Greenwich Hospital from fire, and an arrangement was made by the company for the erection of a reservoir in Greenwich Park and another one on Woolwich Common, at elevations which in the opinion of the authorities were deemed to be sufficient for the protection of those properties from fire.

4229. And those are the reservoirs which you have pointed out to the Committee?—Those are reservoirs which are in use, and available for the general supply of their respective dictricts.

4230. In those Government establishments have they put down hydrants for utilising their supply?—Yes, a separate fire-main was laid from the reservoir in Greenwich Park to the Greenwich Hospital, and another from the same reservoir to the Dockyards and the Victualling Yard at Deptford, and in those establishments hydrants have been placed upon the mains, and they are found to be of very great use.

4231. Do you supply the water for those establishments on the meter system?—Those fire-mains are separate altogether from the supply which we give to them.

4232. But how do you regulate the use of them. We have it in evidence before the Committee that in another company the use is regulated by the hydrant being sealed, and a fixed charge made for every time the seal is broken. The last witness stated that the hydrants at the docks were regulated by meter, so that the water used was charged for?—The fire-main at the Victualling

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Victualling Yard is commanded by a meter, and so the one at the Greenwich Hospital.

4233. Therefore, I presume, the water supplied in cases of fire is charged for, and not, as in other cases of fire, given gratuitously?—The meter is merely put there as a check against the use of the water in the ordinary way.

4234. The company satisfy themselves that it is used properly for the purpose for which the Act prescribes it shall be given gratuitously?—Yes; the meter is put there to see that the water which is used from the fire main is used for the purpose of fire only.

4235. With regard to the delivery of water, on which we have had some evidence, it being a requirement made by Captain Shaw to have a delivery of 2,000 gallons a minute for 24 hours consecutively, Mr. Bramwell stated to the Committee, in answer to Question 5855, that that supply given for 24 hours would exhaust a very large proportion of the whole supply of the metropolis; do you agree with that statement?—It would absorb a certain proportion; but I wish to make an explanation in regard to the especial reference which Mr. Bramwell made to the Kent Water Company supply. In his answers to Question 5855 and following questions, he points out that to deliver 2,000 gallons a minute through the 24 hours consecutively would absorb, say one-third of the total supply. But it must be borne in mind that there is a storage equal to one day's supply in the company's reservoir, and that is maintained against the draught by pumping throughout the day, and that the daily supply does not exhaust the quantity which the engines could be made to deliver if they were kept at work during 24 hours; they are only kept at work now during a part of the 24 hours.

4236. You represent that your engines, in the event of any such great draught, could work double tides?—Yes.

4237. And therefore your power of meeting that draught is greater than would be inferred from that evidence?—Yes; I do not think that Captain Shaw's requirements could overtake what our engines could supply, when you consider the large quantity which is in store to start with.

4238. Even supposing, which has not been disputed, the necessity of giving any such supply at one point, do you believe the capacity of your reservoirs and your means of delivery, would meet that demand?—The capacity of the reservoirs in their respective districts has always proved amply sufficient for fire purposes under the demands which have been made on them, and the means of delivery might, in some places, satisfy the very large demand which Captain Shaw has put forward, but in the greater portion of the district, the pipes conld not convey such a quantity; and, I may add, there are few places in the Kent district where it would be likely to be required.

4239. However unwise it might be, in a great emergency, by connecting your reservoirs, as you say you can together, you might really utilise the whole of your 6,000,000 gallons for the purpose of meeting such a draught upon you?—Yes, the means exist of using the supplies from the various reservoirs in common if absolutely necessary.

4240. You mentioned just now the Government Departments having made some special arrangements; your district comprises some other arrangements made by the War Office, does it not?—Yes; I think that I also referred in my explanation of the supply provided for the Greenwich Hospital and the Victualling Yard at Deptford to the War Office reservoir on Woolwich Common. Arrangements were made with the War Office for the erection of a reservoir on Woolwich Common for the supply of water for the protection of the Government establishments in the town from fire, and there is a perpetual right of user to the company of the water from that reservoir for the general supply of the district, provided a certain quantity is maintained in the reservoir in case of fire at the Government establishments.

4241. By agreement with the Government you are bound to maintain a certain head of water in those reservoirs?—We are. May I also mention with regard to the arrangement with the Government for the provision of that supply of water for the protection of the Government property from fire, that the Government paid for the mains being laid down, and the cost of the reservoir also. They paid the company about 10,000 *l.* for the provision of this supply of water for fire purposes.

4242. And it is strong evidence of their opinion in favour of this arrange-

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ment of fire hydrants, that the Government were willing to go to that expense? —Quite so. It is also an indication that the pressure to be obtained from those reservoirs was sufficient in the eyes of the Government of that day for the protection of their property, which stands at about the same elevation as the principal properties throughout the lower level of the company's district.

4243. Now, as showing the pressure which you have in your company's district for fire purposes, is the water at present drawn from your mains generally without the intervention of the engine; it has been stated in evidence before this Committee that in your company's Woolwich district the use of hydrants has almost superseded the use of engines?—Yes, that is so; that in a large proportion of cases the water is supplied direct to the fire by means of standposts and hose, or hydrants, if there happened to be any at hand; and a fire is put out very frequently without the use of engines.

4244. That was the case, was it not, in Church-street, Deptford, where a fire was put out by means of hydrants before the engine arrived?—Yes; on the 12th of April last a fire occurred in Church-street which was extinguished by water thrown direct from the main through two lengths of hose.

4245. Are there any other instances which you wish to mention to the Committee?—Another fire occurred about the same time at the Royal Hill, Greenwich, which was also extinguished by hose attached to a hydrant upon a main in an adjacent thoroughfare, London-street.

4246. Can you confirm what was stated by one witness, that the turncock in Woolwich reported that engines had hardly been used for two years in his district for extinguishing fires?—I am informed by the turncock of that district that it is the usual practice to extinguish fire by the application of water direct from the pipes, either by hydrants or stand pipes, and he states that the engine has been used only three times since he has been there (six years) at fires at which he has been present.

4247. And that there have been fires during that time at which he has attended, and which have been put out by water supplied by the company through the use of hydrants?—Quite so. We have not a register of the number of fires that have happened in the Woolwich district during the time that this turncock has been there, but he gave it to me that to the best of his judgment there had been about 60 fires during the six years, and that he could only recollect three where the engine had been used.

4248. That in six years three out of 60 were the only cases of fire in which he remembered the engine being used, and that at all the others the fires had been dealt with by the application of water through the use of a hydrant?—Yes; the large properties in Woolwich, being the Government establishments, are separately protected; the other property there is not of a very valuable kind; it is small house property; shops, and so on, and fires there are usually put out either by hand-pumps, or the application of the water through standposts or hydrants.

4249. With regard to the rest of your district; supposing it were all laid down under constant supply, do you think the same conditions could be met?—The pressure through the other portion of the district would be of course affected by the elevation at which the property happened to stand.

4250. But what I understand is, that you are obliged by your Parliamentary obligation to give a certain pressure of water throughout your district?—Yes.

4251. You have represented to this Committee that the pressure is really, in many instances, considerably above that?—Yes, no doubt.

4252. Would that pressure enable you, if you applied hydrants generally to the constantly charged mains in your district, to utilise hydrants in the way you have been able to utilise them in Woolwich and Deptford?—Yes; if hydrants were placed on all the constantly charged mains which exist, it would enable the water to be used to very great advantage, and would extinguish fires without the intervention of engines in many cases; there are, no doubt, parts of the district, here and there, where it would be required, as it is at Liverpool in certain parts of the district, that the engines should be brought to supplement the pressure from the main.

4253. But as an auxiliary to the system of working by engines for the purpose of extinguishing fire in your district, you think that an enormous addition on the side of safety could be procured by establishing hydrants generally?—

Very

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Very great facilities would be afforded by the adoption of hydrants upon all the constantly charged mains in the district.

4254. There is one other advantage also with fixed hydrants, that I believe great difficulties are occasionally found in using standposts under your present plug system?—Yes; some little time ago I recollect a case in which an accident occurred through attempting to drive a standpost into a plug orifice; the pipe was broken, and the water from the service-pipe could only be used through a fire engine; if there had been the fixed appliance of a hydrant upon the main in the street, this operation of the driving of the standpost had not been necessary, and the fire could have been put out by the application of water from the main by a hydrant, without the intervention of the engine. I think that shows the advantage of having permanent fixed appliances in place of these temporary measures with standposts.

4255. The standpost is, from what you have pointed out, not available in many cases?—The adoption of standposts, and using the water direct, where it can be done, appears to me to be tantamount to the admission, the standpost being equal to a hydrant in its result, that hydrants would be useful, only it is not equal to a hydrant in this respect, that there is a danger of breakage in driving the standposts into the pipes, and that to drive the standpost requires the removal of the plug before the water is turned on, and that the inconveniences which at times arise in regard to those arrangements constitute the principal complaints against the companies, whereas in all streets where there are mains they might be obviated.

4256. I think you mentioned a great fire at Rotherhithe which was dealt with under a system of constant supply with hydrants?—Yes; that was a large fire at Messrs. Gabriel's timber-yard, in the constantly-supplied district of Rotherhithe. The fire broke out at three o'clock in the afternoon, and there was a good supply of water. A length of hose was attached to one of the hydrants on the company's main, and the pressure burst the hose. Water was played on the fire from a double-delivery hose from this hydrant, which was afterwards superseded by a steam-engine. A double-delivery hose was supplied during the whole time from a hydrant on the main opposite the gates. Two other steam-engines were supplied from two hydrants in the neighbourhood, and the supply of water was taken as required for 16 hours. The main there is an 8-inch pipe.

4257. Can you give the different lengths of pipe which constituted this supply?—The diameters of the different lengths of pipes which constitute the main to this spot are as follows: 3,330 yards of 12-inch, and 780 yards of 8-inch. Upon the 8-inch main there were three hydrants placed, and one on a 4-inch, and one on a 3-inch pipe.

4258. Was the supply to the district interrupted during the time of this draught of water?—Not perceptibly so. The fire was observed from the works of the company, but it was thought to be on the other side of the river, and there was no indication of anything unusual going on in the draught of the water.

4259. That is to say, that at the reservoirs you had no indication that a fire was making this great drain upon your supply?—No, there was no indication observed of anything unusual going on in the draught.

4260. Did they continue to use the engines during the whole of that fire, or did they rely upon the hose for the extinction of it?—I believe the land-engines were withdrawn early in the evening, and that the floats, hydrants, and hose were relied upon to complete the extinguishment of the fire during the night.

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Monday, 7th May 1877.

MEMBERS PRESENT:

Mr. Clifton.	Mr. M'Lagan.
Mr. Forsyth.	Mr. Onslow.
Mr. Hardcastle.	Sir Henry Peek.
Mr. Hayter.	Mr. Ritchie.
Sir James M'Garel-Hogg.	Sir Henry Selwin Ibbetson.
Mr. Kinnaird.	Mr. Stevenson.
Mr. Locke.	Marquis of Tavistock.

SIR HENRY SELWIN IBBETSON, BART., IN THE CHAIR.

Mr. *Alexander Dickson*, re-called; and further Examined.

Mr. *A. Dickson.* 7 May 1877.

4261. *Chairman.*] Is there anything in your evidence given at our last meeting that you would wish to call the attention of the Committee to, before resuming your examination?—Yes; I should like to supplement a part of my evidence with respect to the correspondence. At Questions 4053, 4054, and 4055, reference is made to the letter of the company to the Metropolitan Board of Works, upon the general subject of the water supply at fires under date August 1869; in the following question you asked me if there was any notice taken of that by the Board, and I replied: "There was no reply to that letter at the time;" and then I went on to explain that in October of the same year a letter was addressed to the Board asking a direct question with regard to the arrangements for the attendance of turncocks at fires; and your next question was: "You did get an answer to that letter, did you not, from the Metropolitan Board of Works, in which they stated that they proposed in future that the brigade should be instructed to call the turncocks; was not that so;" and I replied under the impression that the question referred to the letter of August 1869, and I said: "Scarcely so; the letter that we received from the Metropolitan Board of Works informing us of the arrangement they had made for summoning the turncocks was written upon the 11th of November 1869. I will read a copy of it." I would wish now to put in, in supplement of that correspondence, the letter of the company of the 26th of March 1870, in which, after referring to a complaint which had been addressed by the company to the Board with regard to the supply of water at a fire in Dock-street, the secretary of the company concluded his letter by the following paragraph: "I have again to request the favour of an answer to my letter of the 11th August last." Then, upon the 8th of April following the Metropolitan Board of Works replied to that letter in the following communication: "Dear Sir,—In your letter of the 26th ult., you request a reply to your letter of the 11th August last, on the subject of the supply of water at fires. Your last-mentioned letter contained two suggestions for obviating the delay and the insufficiency in the supply of water at fires which sometimes occurs. First, that hydrants should be placed on the main throughout the Kent Water Company's district; and secondly, that as regards services where the supply is intermittent, some arrangement should be made that would indicate the exact spot in every street where the use of a key would enable any officer of the fire brigade to procure instantaneously a full supply of water. With reference to the first suggestion, viz., that hydrants should be placed on the mains, I have to inform you that the subject is still under the consideration of the Fire Brigade Committee of the Board. With regard to the second suggestion, the committee are of opinion that it would not be practicable under the present system of intermittent supply." Then there are two other

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other printed letters, of which I think the company would like to hand in copies to the Committee with regard to the general question of the supply of water at fires; they are included in the printed statement.

4262. Have you referred to them in your evidence at present?—Not yet.

4263. To what period do they refer?—In the sequence of the correspondence they would come in between some of the letters which were transmitted between the Board and the company with regard to the supply of hydrants to the constantly supplied district of Plumstead; the first of them is dated the 23rd of December 1874.

4264. Will you read that letter in order that the Committee may be in possession of it?—It is dated 23rd December 1874, from the Board of Works: "Sir,—The attention of the Fire Brigade Committee of the Board has lately been called by complaints and inquiries from local boards and others to the delays which, even with the best efforts of the water companies, occasionally occur in obtaining a supply of water at fires. The committee is well aware that the only certain way of avoiding these delays, and of being always sure of an immediate supply of water available for extinguishing fires, is to have all the mains constantly charged at high pressure. But the committee is anxious to ascertain whether in the interval of time which will probably elapse before the attainment of this desired state of things throughout the metropolis, some means might not be found by which the men of the fire brigade would be able, on arriving at a fire, to obtain immediately for themselves a supply of water without waiting for a turncock, in the event of the latter not being at a fire so soon as themselves. With each fire engine is always carried, as you are aware, a complete set of turncock's tools, so that the firemen have the necessary implements and what is wanted, under the present intermittent system of supply to enable them to get water for themselves is a knowledge of what mains in the immediate neighbourhood are charged with water at the time. The Fire Brigade Committe, therefore, ventures to suggest, and would ask your directors kindly to consider whether some plan could not be adopted of turning the water into the various mains at certain fixed hours of the day, and of making the fire brigade acquainted with the hours fixed for each part of the district, so that on reaching a fire the brigade might know at once where to go for water. Will you be good enough to lay this letter before your directors, and make the Fire Brigade Committe acquainted with their views upon the suggestion offered in it? I am, Sir, your obedient servant, *J. E. Wakefield*, Clerk to the Board."

4265. In that letter you have the Metropolitan Board of Works calling your attention to something very similar to what you had pointed out to them in your letter of 1869?—With this important difference, I think, that in the letter of 1869 from the company, a suggestion was made that some means should be adopted for indicating the exact spot in every street where the use of a key would enable the fire brigade men to obtain for themselves a supply of water. In this proposal of the Board it is that the water should be turned into the services at fixed periods.

4266. Whatanswer, if any, did your company give to that; or did they entertain the idea?—The letter of the Board was fully considered, and the following reply was made on the 10th of February 1875:—"Sir,—Your letter of the 23rd of December last, on behalf of the Fire Brigade Committee of the Metropolitan Board of Works as to the supply of water for the extinguishment of fires, has been considered by the Directors of the Kent Waterworks Company with reference to their company's district." Then follows a quotation of the tenor of the letter from the Board, which paragraph I need not read. The company's answer was couched in these terms: "Before giving the views of the directors of the Kent Waterworks on the subject of the above inquiries, I would premise, that while it is the business of the company to supply the inhabitants with water, they admit it is also their duty to furnish gratuitously water for the extinguishment of fires, and for that end to afford every facility, but it rests with your Board to provide the necessary appliances for the effective use of the water. The directors of the Kent Waterworks are surprised at the inference, which the language of your letter conveys, that the company's mains are not always charged at high pressure, whereas such mains, as distinguished from service pipes, are, in fact, now and always have been so charged.

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It will be in the recollection of your Board that in consequence of some accusations of late attendances at fires by the company's turncocks, the then secretary of the Kent Waterworks Company, on the 11th August 1869, addressed a letter on the subject to your Board, in which he informed them that the company maintained by their machinery a constant pressure in all their mains (about 80 miles), aided by reservoirs at various altitudes, varying from 163 to 314 feet above the Ordnance datum." Then this letter recounts the other suggestions which were made in the company's letter of 1869, and continues: "Your Board did not answer the letter of the 11th August 1869, until the 8th April 1870, and then only upon being urged by the then secretary of the company to do so. Their answer with reference to the suggestion that hydrants should be put upon the mains was that the subject was still under the consideration of the Fire Committee; and, with regard to the second suggestion, viz., that where the supply was intermittent some arrangement should be made that would indicate the exact spot in any street where the use of a key would enable any officer of the fire brigade to procure instantaneously a supply of water, your committee replied that they were of opinion that it would not be practicable under the present system of intermittent supply. The directors of the Kent Waterworks are not aware that to your letter of the 23rd December last, any other answer can be given than that which is expressed in the suggestions contained in the letter of the then secretary of the company, dated 11th August 1869. From that day to the present, now upwards of four years, the directors of this company have not received any further communication from your Board upon the subject, except as regards the districts of Rotherhithe and Plumstead, which, by the voluntary action of the company, have been placed under constant supply, your Board having, upon the requisition of the company in compliance with the recent Act, caused 30 hydrants to be placed upon the mains in the former; but the greater part of the company's mains are still without hydrants, and, with the exception of the district first named, are still in the same condition in that respect as they were at the time of the correspondence before referred to. The directors of the Kent Waterworks Company consider that the suggestions contained in your letter for turning the water into the services at fixed periods, and giving information thereof to the fire brigade, are not capable of being practically carried out. They, however, desire me to inform your Board that they are fully alive to the great importance of the subject of the supply of water for the extinguishment of fires, as indeed they have evinced by taking the initiative in making suggestions years since, as shown by the correspondence, and they have, from time to time, taken every step within their province to provide a prompt and abundant delivery of water at fires. In order to ensure the speedy attendance of the turncocks at fires, the company some time since required their turncocks to reside close to the fire-brigade stations, since which the complaints of delay have ceased. In conclusion, I am desired again to suggest, as the only practicable solution of the question, that your Board cause hydrants to be placed on the whole of the company's mains where they are now wanting; and that, as regards the services, some arrangement be come to for indicating the spot in every street where the use of the key would enable the officer of the fire brigade to procure a supply of water. For this object the directors of the Kent Waterworks are anxious to afford every facility, and they direct me also to suggest that some officer of the brigade be placed in personal communication with their engineer, in order to concert measures for the attainment of it."

4267. Those are the alterations and additions which you would like to make in the evidence given by you on the last occasion?—Yes; those are the additions and correspondence I would like to put in.

4268. I think we broke off on my asking you whether you could state to the Committee the number of hydrants which at present exist in the Kent Company's district generally?—That was so. The number of hydrants in the Kent Company's district is 1,078; of those 255 have been erected for the purpose of road watering and putting out fires; that number includes a certain number of hydrants which have been put up by the Eltham authorities for fire purposes.

4269. Were those put up by the parish themselves at their own expense?—They have been recently put up by the parish, and, I think, at their own expense.

4270. Are

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4270. Are you aware what the form of hydrant they have adopted there is; whether it is the same as those which you placed in Rotherhithe and Plumstead?—I am not aware of the form of hydrant which they have adopted in the Eltham district. The last answer I gave had reference to the provision of a few hydrants by the authorities of Eltham last year.

4271. That is 255?—Yes; in the Government establishments there are 457, and in private establishments there are 257. Under the metropolitan authorities' request, 30 were put up in Rotherhithe, and 61 were put up in Plumstead under the provisions of the Act of 1871, making 91 put up under the provisions of that Act. Then there are 18 other hydrants which the company have put up for their own purposes, making a total of 1,078.

4272. Are those last 18 hydrants which the company substituted for plugs?—Yes; the company's engineer advised that it would be necessary to replace some of the plugs in the district by hydrants, because in the first place they are liable to be blown out by the pressure in the pipes, and secondly, the company would require to use them for washing out the pipes.

4273. Are those 18 the same sort of hydrant as you supplied to Plumstead?—Yes; they are 2½-inch ball hydrants.

4274. Were those 18 hydrants which the engineer recommended in substitution of plugs fixed upon mains, or were they fixed on the services in the lower districts where the pressure was greatest?—Those 18 have been placed upon the smaller pipes, the 3-inch pipes in connection with the mains, but at the end of the services, as we call the small pipes, in order to admit of their being washed out at such times as might be necessary.

4275. Then it was not entirely from the fact that the plug was forced out, but from the other requisite, that of washing the pipes?—It was for the first reason in this way: that had the pressure not been such as would have exposed any plug to the danger of being blown out, the company might have continued to use the plug for the purpose of washing out the pipes.

4276. That brings me to the question of the possibility of putting plugs upon mains, and I daresay you are aware of Sir Joseph Bazalgette's evidence before this Committee, in which he stated that, to a great extent, plugs exist at present, and that no danger of that sort was found in them?—That is so; Sir Joseph Bazalgette expressed that opinion, but that opinion is not correct as regards the Kent Company's district. As a matter of fact the company have not provided plugs on the mains; they have been placed upon the services, and the explanation which I have given as to the conversion of 18 of these plugs into hydrants will show that the company consider it necessary, when pipes are subject to constant pressure, that those plugs should be replaced by hydrants.

4277. Can you give the Committee any instances of the plugs being displaced by the pressure which your company give?—The company some few years ago had a plug upon a main pipe in Wellington-street, Deptford; that plug was displaced, and it flew up into the street to a great height, and a volume of water was projected on to the roof of an adjacent house, and did considerable damage to the property, and the plug was, from that time, discontinued.

4278. I understood Sir Joseph Bazalgette to say that the pressure on the plug under the intermittent supply was more trying than under the constant supply, in consequence of the fact of its being intermittent; do you agree with that opinion?—I think Sir Joseph Bazalgette expressed that opinion in answer to Question 5658 and the following, and the explanation that I would offer upon Sir Joseph Bazalgette's opinion is this, that when the water is turned into the service-pipe the pressure for a time is lost, to a great extent, on account of the water flowing into the cisterns supplied therefrom, which may not be full at the time, or into any other outlet that there may be from the pipe, and the service-pipes being of comparatively smaller capacity, do not admit of the flow of the body of water necessary to keep pace with the draught and maintain the pressure; and then, as the draught ceases, the pressure increases, and the supply is shut off, so that in practice, under the ordinary conditions of an intermittent supply, the sudden blow described by Sir Joseph Bazalgette would not be experienced.

4279. It would be a gradual and not a sudden pressure?—It would be a gradual and not a sudden accumulation of the pressure.

4280. But Captain Shaw stated, did he not, that when the water was turned on from the main to the services he could not get the full benefit of the pressure

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for some time until the cisterns were filled?—Yes; Captain Shaw has given that in evidence, and to that extent has confirmed the explanation which I have just given. With regard to the effect of pressure upon plugs, I may say that plugs on services are frequently blown out on the Kent Company's district, but the consequences are not so serious as they would be if the plugs were on the larger pipes. I may mention an instance which happened a year or two since at Sidcup when a plug blew out just as a gentleman and his family were passing in a chaise; the horse was very much frightened, and unfortunately backed them under the full descending stream in such a way that the ladies, I believe, were obliged to borrow some clothing to enable them to go home.

4281. That would not have been the case if there had been a hydrant there, for instance?—No; that would not have been the case if a hydrant had been there to hold the pressure.

4282. I suppose in frosty weather you are liable to have the plugs blown out, are you not?—That is so, and several plugs have been blown out in the Plumstead and Woolwich districts more particularly in the frosty weather, and owing to one of those plugs being displaced, a volume of water was thrown on to the roof of a public-house adjacent, and caused considerable damage. I recollect another instance of a plug being blown out in the neighbourhood of Chislehurst; some ladies were driving by, and the ponies in the carriage were very much frightened at this rush of water from the pipe, and bolted; fortunately the ladies were not personally injured, but considerable damage was done in that case.

4283. Captain Shaw, I think, confirmed your statement, did he not, with reference to the supply of water which was obtainable in your district generally?—Yes; in the evidence which Captain Shaw submitted to the Select Committee in 1867, in advocating the desirability of a constant pressure of water for fire purposes, he drew attention to the fact that the plugs on the services did not afford, in many cases at starting, so good a supply as afterwards. At Question No. 3313 he was asked: "You do not mean to say that the water does not flow out of the fire-plugs as soon as it is turned on? *A.* Certainly not; it does flow out when the water is turned on, but not in the full quantity until after every cistern throughout the service is completely filled, so that the ball-cock in each case is taken up to the point of shutting off the supply." And then Question 3321: "When the cisterns all round are charged you usually get a full supply of water? *A.* We usually get an abundant supply then."

4284. That is what I mean; Captain Shaw did state that generally the supply was abundant?—Yes, I might perhaps also offer an explanation upon that answer to Question No. 3313, namely, that inasmuch as in nearly every street where there are mains without hydrants, there are also services with plugs, and the fire supply is only obtainable from the latter; if the plugs were dispensed with and hydrants placed on the mains, the supply of water for fire purposes would be altogether independent of and unaffected by the draught for the supply of the district, excepting only during the few hours in the day when the services were open; and by turning off these service cocks, which the brigade have power to require or to do as they please, the full supply from the main could be had; but in taking the supply from the plug on the service there is no means of concentrating the full supply upon that plug until all cisterns on that service have been filled, and every outlet closed.

4285. That would imply a continuance of the service of the turncocks in order to turn off the domestic supply?—If the supply were intermittent, unless the district were being supplied in the day, the turncock's presence would not be required if the fire brigade had the means of helping themselves to the supply from the main.

4286. But I understand you to say in explanation, that that would be the case if the hydrants were placed upon the main, with the exception of those few hours in which the water was being supplied to fill the cisterns, and then if more pressure were wanted in the mains, it would require shutting off that draught into the service pipes to get the full pressure, so that if a fire occurred during those hours you would be dependent upon the turncock for maintaining the whole supply of pressure upon the mains?—Yes, if the supply from the mains during the time the district was being served was not sufficient, and it was required to augment it by concentrating the supply upon that point, then the services of some one in the capacity of a turncock, whether an officer of the water company or the fire brigade, would be required.

4287. Otherwise

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4287. Otherwise the services of the turncock could be dispensed with?—Yes, they could be dispensed with, except that under this arrangement, and even under the constant supply arrangement, if it were required to concentrate the supply upon any one particular portion of the constantly supplied district, by shutting off the volume in other parts, then the services of some person in the capacity of a turncock would be requisite, as they are at Liverpool. I think the fire brigade of Liverpool have a man specially qualified to carry out these duties.

4288. In Liverpool, the Committee had evidence from a witness, fire-plugs upon mains are used still, without the difficulties which have been suggested?—Yes; I noticed in reading the evidence that that was a point to which Mr. Bramwell drew special attention, but I think I may point out here that the Report of the Committee of the Metropolitan Board of Works, who went down to see the arrangements at Liverpool and Manchester, states that those plugs are being rapidly replaced by hydrants.

4289. Admitting that there is something in the plug which they do not think equal to the hydrant?—I think that points very strongly to the correctness of the company's suggestion, that these plugs should be replaced by hydrants.

4290. With regard to your company and Sir Joseph Bazalgette's figures with reference to pressure, I think Sir Joseph describes your pressure on the constant supply system as varying from 20 lbs. to 48 lbs.?—Yes, I think Sir Joseph has so described it in his evidence, but I think that his evidence was a little inaccurate on that point, as I will explain. Sir Joseph Bazalgette has furnished me on my application with particulars of the localities, and the position of the plugs from which the Board's observations were taken, and from an examination of those relating to the districts under constant supply, the minimum pressure recorded in the tabular statement is 26 lbs., and that was a pressure taken from a pipe supplied temporarily through a meter placed on a bye-pass, near the stop-valve, for the purpose of testing the supply of water in that particular district, and to ascertain if any great waste was going on there. That meter having only a water way of three-quarters of an inch, if anyone were drawing water when the observation was being made, that would greatly affect the pressure by reducing it.

4291. It was inaccurate to that extent?—That explanation will account for the comparatively low pressure which was found on that pipe. I wish to point out that in the constantly supplied district of Plumstead the elevation of the ground varies from 20 to 130 feet, Ordnance datum, and that a corresponding variation in pressure must necessarily prevail. The maximum mentioned by Sir Joseph in this answer must have been inadvertently given, as in a subsequent answer, No. 5765, he refers to a pressure of 62 lbs. both day and night, as found in that district.

4292. Does that district mean the whole of your district, or only a portion of it?—The portion of it under constant supply.

4293. That would probably be the Plumstead district?—The Rotherhithe and Plumstead district. Questions 5765 is, "That must have been a very exceptional instance; there must have been something particularly wrong there, I think." That was referring to a case in which the pressure had been altogether lost at night, and which I will advert to presently, to which Sir Joseph Bazalgette replied: "I should think so. I have another near the Royal Arsenal at Plumstead, where the pressure was 60 lbs. in the daytime, and 59 lbs. at night. Another where the pressure is 61 lbs. in the daytime, and 60 lbs. at night. Another 60 lbs. in the daytime and 58 lbs. at night. Another 62 lbs., both day and night the same; and another where the pressure was 56 lbs. day and night."

4294. Then the next question being "The pressure all through that district appears to be very good both day and night?" he says in reply, "It is the highest of any"?—Yes: but upon the return which was furnished to me the maximum reached appears to be from 60 lbs. to 70 lbs. in one case.

4295. Is that the return which Sir Joseph Bazalgette furnished to you?—Yes; therefore the statement should have been that the variations in pressure in the constantly supplied districts of the Kent Company, as upon the Board's observations, were from 26 lbs. to 70 lbs., instead of from 20 lbs. to 48 lbs.

4296. You gather that from the answer that Sir Joseph Bazalgette gave to

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the Committee, and from his subsequent statement to you on your application? Yes; I gathered that the answer I referred to was inadvertently given, because Sir Joseph Bazalgette subsequently referred to a higher pressure than is referred to in this reply.

4297. In the tabular statement of gauges referred to in the report of Sir Joseph Bazalgette, which you will find at page 655, you will find a table giving the pressures of your company, and there is one with 200 feet above Ordnance datum, in which the pressure is given as 12?—That would not be in the district under constant supply.

4298. That is not in the district referred to by those figures given by Sir Joseph Bazalgette?—No, it would not be so. I should like to refer in the answer which I have just given, relating to the variations of the levels in the Plumstead district, to the answer which I gave to Question 4224, in order that there may be no misunderstanding of my meaning upon that point. I am asked there, "Are your levels very varying in that district?" to which I reply, "They do not very much vary in the lower districts, nor even in the upper districts according to the height by which they are commanded." I would explain that whilst apparently extreme variations of levels do appear in some districts, by far the greater proportions of the districts commanded by the several reservoirs are more or less at common levels. If you stand upon the high ground in front of the Observatory in Greenwich, part of the parishes of Greenwich and Deptford appear to the front and west, lying upon the low ground abutting upon the river, and it will be seen how very commonly even is the level running through the whole of this district.

4299. Then there are one or two spots which produce the variations which are shown upon that table?—Yes. Then again, if you stand upon the high ground above Woolwich Common you would see what a more or less common level runs along the table land stretching out towards Blackheath, which would be supplied from the high level reservoir.

4300. Has your company ever kept any records of the pressures in various parts of your district?—I will hand in to the Committee some of the results. Before leaving this question of the pressure in the constant supply district, I would like to make an explanation of Sir Joseph Bazalgette's reply to Question 5764; it was a case to which he referred as being one in which the pressure was altogether lost at night as compared with that found in the day. The explanation is, that the hydrant from which the observation was taken is placed on a pumping main into the high reservoir, and that main is only under pressure during the time the engines are at work during the day.

4301. Your engines do not pump, as I understand, at night?—Quite so.

4302. Consequently that would account for the loss of pressure at that spot?—Quite so; but that is not in the district under constant supply. Then there was another instance referred to in the answer to Question 5767, in the Victoria-road, Charlton, in which the pressure was altogether lost at night. The explanation is, that the observation was taken from a service-pipe, which is charged only in the daytime.

4303. Are there many service-pipes so emptied during the night throughout your district?—The proportion of the pipes under intermittent supply is, I think, about 70 miles out of 150 miles.

4304. And this was one of the intermittent supply pipes?—It was one of the intermittent supply pipes. I do not know whether it will be convenient at this point to refer to the question of the loss of pressure by friction through 200 feet of hose. I should say that during the interval of the sittings of the Committee last year an opportunity occurred for making one observation in Anne-street, Plumstead. The spot is situated about 30 feet above Ordnance datum, and the pressure at the hydrant as recorded on the gauge placed at the junction of the hose with the hydrant was 138 feet. I think Sir Joseph Bazalgette stated that 200 feet of hose would generally absorb the pressure to be found throughout the metropolis.

4304.* At Question 5781, Sir Joseph Bazalgette is asked: "I think I understood you to say that, generally speaking, throughout London, with a hose 200 feet long, the water would not rise beyond the surface?" And he replied: "That is so; the pressure would be exhausted in delivering that quantity of water through the hose." Then he was asked: "So that, generally speaking, taking

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taking London throughout, water passing through a hose of 200 feet in length would not go beyond the surface? *A.* You may get a small jet and throw it up, but, generally speaking, you will not get it beyond the surface without pressure."—Yes. I was about to give the Committee the result of experiments made as to the delivery of water through 200 feet of hose 2½ inches in diameter in the Kent Company's district.

4305. Is that an experiment that you have made yourself?—Experiments that were made in my presence; the pressure at the hydrant was 138 feet; there were 200 feet of 2½-inch hose; the pressure at the delivery end of the hose was 120 feet; the nozzle was a 7-8ths-inch nozzle; the hydrant was a ball hydrant, and a jet of water was delivered for a distance horizontally of 96 feet, and to a height above the tops of any of the houses adjacent. I had no means of measuring the actual height of the jet, but it would be proportionate to the horizontal distance.

4306. Was that in the constantly supplied district?—That was in the constantly supplied district, and, doubtless, the delivery was not the 150 gallons a minute upon which Mr. Bramwell based his calculation; but the jet was one which would be very effective, and quite as much so as any jet thrown by the engine provided by the brigade for the protection of that district. I might also relate to the Committee that at a fire recently in the rear of the Ship Hotel, Greenwich, at Vassard's Patent Fuel Works, the police fire brigade from Greenwich Hospital turned out; they connected their hose to one of the hydrants in the Hospital grounds, and, in order to reach the premises on fire attached eighteen 40-feet lengths, in all, 720 feet, and through it delivered into the fire a most effective jet through a 7-8ths or 1-inch nozzle. I have seen a jet thrown from the roadway through the Hospital from a 7-8ths inch nozzle at the end of 120 feet hose, and also another through a 1-inch nozzle, and the water reached fairly over the chapel roof, which is a very high part of the building opposite the corner where the Painted Hall stands.

4307. Was that a continuous strain upon the pipe; did you continue it for any length of time, or was it merely taken for a minute or two?—It was not continued for any great length of time; it was simply one of the days on which the fire brigade police were being practised in their appliances, but the inspector told me that that was the usual height that he was able to throw water with those appliances.

4308. With that length of hose?—With that length of hose. I should say the pressure is 65 lbs. at the Royal Hospital.

4309. That would give about how much in feet?—About 150 feet. I may also relate to the Committee some experiments which were made on Wednesday last with 200 feet of 2½-inch hose. This was in the Royal Victoria-yard at Deptford.

4310. Is that a constantly supplied district?—Yes, that is constantly supplied, and the Royal Hospital at Greenwich is constantly supplied, and they are both in connection with the same reservoir in Greenwich Park. The hose was attached to a full-way fire-cock, on a 9-inch main, and the pressure was 65 lbs., and with a 7-8th inch nozzle delivered a volume of water of 135 gallons per minute, and a jet was projected to a distance of 120 feet, not in spray, but in the body of the jet.

4311. The body of the jet as a fair delivery of water?—Yes.

4312. Sir *Henry Peek.*] Was that horizontally, or at what angle?—I cannot tell you the exact angle, but the nozzle was held at the angle which the fire-brigade men thought would project the water the farthest; it was tried at different angles in order to see which would give us the greatest projection; the greatest projection gave us this 120 feet, and then an inch nozzle was attached, and 187 gallons a minute were delivered through 200 feet of hose to a distance of 132 feet. A 1¼-inch nozzle was attached, and a volume of water of 200 gallons per minute was delivered to a distance of 106 feet. I think those results will compare very favourably with the results which were seen by the members of the Metropolitan Board of Works on their visit to Liverpool, and in some places at Manchester.

4313. *Chairman.*] You represent that in these constantly supplied districts that amount of pressure might be relied upon?—Yes, as more or less affected by the arrangement of the distributory pipes. Of course in the case of small pipes the pressure would be affected more or less by the size of the pipe and the extent of the draught.

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4314. But; supposing the hydrant to be fixed on your constantly charged mains, that would be the result you would obtain?—A proportionate result would be obtained. I should say with regard to hydrants superseding engines it is the case that notwithstanding these results which are obtainable from the hydrants in the Victualling-yard and at Greenwich Hospital the authorities there have not done away with their engines; they keep them in case of need.

4315. They do not suppose at all that they would be able to supersede engines, but they supplement them with these hydrants and hose?—Yes, they find the hydrants very useful, and they have been able to extinguish fires with hydrants, but notwithstanding that experience they do not consider it advisable to be without engines.

4316. Can you give us the different pressures which the company have taken?—I will put them in. I wish also to refer to a remark made by Mr. Freeman, of the Metropolitan Board of Works, as to the reliance which could be placed upon the pressure in the Kent Company's district.

4317. Your pressure at night being entirely by gravitation?—The pressure by night is entirely by gravitation, say from 6 p.m. to 6 a.m., and is given by the respective commanding reservoirs, and that pressure can be relied on and will continue as long as there is water in the reservoir.

4318. In the daytime the pressure, though chiefly by gravitation, is still in a great measure assisted by pumping?—In the daytime the pressure is also chiefly by gravitation, and the engines by pumping into the mains from which the supplies are being taken maintain to a considerable extent almost as high a pressure throughout the day as at night, except only for short periods of perhaps a quarter or half-an-hour, when a large service has been opened. The ascertained difference between night and day pressure was referred to by the subsequent witness, the Deputy Chairman of the Works and General Purposes Committee of the Metropolitan Board. Mr. Richardson in his evidence said, "We go to our own district, because we have tested the water in our Kent water district between night and day, and we found that it was the same by night as by day, showing that at head-quarters, somehow or other, they had reduced the pressure, because otherwise the pressure must have been very largely increased at night, when no water was being drawn out of the pipes." Sir Joseph Bazelgette, in his Report to the Board of the pressure at night in the Kent Company's district, states, "That the majority show a higher pressure;" so that it would appear that Mr. Richardson's inference is not founded on Sir Joseph Bazalgette's Report to the Board, but entirely upon misapprehension of the facts.

4319. Still, I understood you to say that at night there was not the same reliable pressure that you have in the daytime?—There is a more reliable pressure; the pressure during the night is more even than during the day.

4320. But it would have to be supplemented, in the event of any great drain, by setting the pumping engines to work?—In the event of any great drain upon the reservoir for a long time, the pressure could be supplemented by setting the engines to work, but it has never been necessary to do that. Some of these diagrams I have here will show a few of the records which have been taken of the pressures in different parts of the company's district. The first one which I put in is one at Rotherhithe, on the 8-inch main at a spot about 8 feet above Ordnance datum, and that was taken on the 14th April 1876.

4321. At what time was that taken?—This was taken throughout the day and (*producing a disc showing the diagram of pressure*) the lowest pressure on that gauge was in the interval between 12 and 2 o'clock, and would not be less than 100 feet.

4322. Whilst the maximum pressure between 6 p.m. and 6.30 a.m. is 150 feet?—Yes; in fact, you may say from 2 o'clock in the afternoon to 6 o'clock the next morning the 150 feet remains.

4323. That is with regard to one particular point of your district?—Yes. Then at Charlotte-street, Plumstead, on a 3-inch branch from a 12-inch main, upon the 6th May 1876, this diagram shows the variations (*producing another diagram*).

4324. Will you give the Committee what the variations are?—The pressure from 7.30 in the morning to 1 o'clock in the day was between 125 and 150 feet, and from 1 o'clock through the remainder of the day and night till 7.30 the next morning, the pressure was never below 150 feet.

4325. That was a constantly supplied district, was it not?—Yes.

4326. And

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4326. And there you never fell below 125 feet?—No.

4327. Rising to 150 feet, as in the other district?—Yes; and this fall occurs in the day when the services in connection with the main for a district not under constant supply are open for the supply of that district, and are being drawn upon. Then, at Charlton, another observation was taken on the 11th May, in a constantly supplied district; the unbroken pressure from 4.30 in the afternoon to 7.30 in the morning was 150 feet. The pressure in the daytime was less at times, owing to the intermittent supply of part of Woolwich, but was not at any time below 100 feet.

4328. It sank as low as that, did it not, in the first instance, namely, to 100 feet?—Yes. Then again in the Kent-road, at the New Cross Gate, upon the 5th June 1876, the pressure throughout the night, from four p.m. to eight o'clock in the morning, was never below 145 to 150 feet, and during the whole day was above 125 feet. Then on Shooter's Hill-road, close to Mr. Richardson's, an observation was taken on the 18th June, and the pressure there, from three o'clock in the afternoon till two o'clock on the following day, was steady, at about, but never below, 100 feet; and between two o'clock and three o'clock in the afternoon, a few feet less, but not during that time below from 88 to 90 feet. A second reading, taken from the same place the following day, gave similar results. On the 10-inch main, near the Kent-road railway station, at 11 feet above Ordnance datum, another observation was taken on the 22nd April, showing a steady pressure, from four o'clock in the afternoon until 6.30 in the morning, of from 150 to 140 feet, and from 6.30 to 9.30, 140 to 125 feet; from 9.30 till 12.30, 100 to 80 feet; and from 12.30 till 4 o'clock, 100 to 150 feet. At the works, Deptford, at 23 feet above Ordnance datum, from eight o'clock in the evening till six o'clock in the morning, the pressure showed 135 to 140 feet; and during the day, whilst pumping, was never below 150 feet.

4329. Those are all in your low-level districts, are they not?—Those results, with the exception of the one near Mr. Richardson's house, are from the low-level districts, and show that during the night, when fires are most frequent, a steady and reliable constant high pressure is maintained in the company's mains, and the experiment in the high-level district shows that there also during the night a steady and reliable pressure from the reservoir, according to the elevation of the premises, is maintained. I may add that the most densely populated and important districts within the company's water limits, from a fire point of view, are situated in the company's low-level district, where the best pressure can be afforded.

4330. The Committee have had evidence with regard to the fire at the King and Queen Wharf; have you anything to say about that fire?—I think Captain Shaw was asked as to whether there was any particular part of the metropolis in which the supply of water had been found to be deficient at fires, and he referred to a district extending, I think, from London Bridge eastwards along the river-side, namely, Bermondsey and Rotherhithe.

4331. That is where the supply of water was described as thread-like?—I think it was so described by Sir Joseph Bazalgette, in answer to Question 5639.

4332. Is that all the supply that the company give in that district for fire purposes?—The company's pipe terminates just about the King and Queen Granary in a 3-inch pipe, and of course the supply from it is nothing nearly as large as could be obtained from the large pipes further down the street, on the main of which that forms a part.

4333. But that is a very insufficient supply for fire purposes, whatever it may be for domestic purposes?—It is sufficient for the domestic supply of the district, and it appears to have been insufficient as a supply for fire purposes, according to the requirements of the brigade.

4334. In your opinion, ought there not to be a main laid in that district for fire purposes?—I apprehend that matter lies entirely with the metropolitan authority to determine. If they consider that they may, by obtaining appliances for the use of the water in the river adjoining, be able to do without any increased main in that district, I apprehend it is not for the company to suggest that a larger main should be put down.

4335. That it would be either from the owners of the private property affected or from the Metropolitan Board of Works, as looking to the safety generally

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of the town, that the application should come?—Certainly; I think the application should come from some one for a larger provision of water, if it is needed.

4336. Has any application been made to the company for an increased supply of water since that fire?—No; no application has been made to the company, either by the owners or the metropolitan authority.

4337. How far is that from your reservoir?—It is about four miles from our reservoir.

4338. What would be the delivery there?—The present delivery is about 100 gallons a minute.

4339. What alteration would be necessary in the mains to meet Captain Shaw's requirements for fire purposes in that district?—The engineer of the company has kindly furnished me with an estimate on this point; he says, if an 8-inch pipe were carried to the end of the company's district at a cost of about 700 *l.*, the delivery of water might be increased about 500 gallons per minute. To deliver the 2,000 gallons per minute at this spot under a pressure of 50 lbs. would require a separate pipe to be laid for the whole distance of 4¼ miles of a diameter of 20 inches, at an estimated cost of about 14,000 *l.*, and to deliver the water at the level of the ground for the supply of engines could be done by 4¼ miles of 15-inch pipe under the existing head of water, at an estimated cost of about 9,000 *l.*

4340. That would give the requirement which Captain Shaw has pointed out as necessary?—Yes.

4341. But at their expense?—Yes, at their expense. I think there is a paragraph in the Report of the Committee of 1867 with regard to the provision of larger pipes in districts where a larger supply of water was required for fire purposes than could be obtained from the existing pipes for domestic purposes. The paragraph was to this effect: "It has been urged that it is impossible to deal with the case of large buildings recently erected in the neighbourhood of small houses, where the supply of water is inadequate for the purpose of extinguishing a great fire; but your Committee are of opinion that there is no difficulty in a main being laid down in such cases under the clause of the Act of 1847, which may be amended in this respect if insufficient."

4342. You have had no application, as you say, from any party with reference to giving a better supply since that fire took place?—No, the company have had no application from the owners or metropolitan authority for the provision of larger pipes, or for the provision of a larger supply of water for fire purposes in that street.

4343. Now, with regard to the expense of the alteration of the fittings for a constant supply under your system, I think you stated, on your last examination, what that had cost?—With regard to that subject, and the remarks which Mr. Richardson offered in his answers to Questions 4888 and the following as to the regulations for the provision of water fittings being "unnecessarily stringent and costly," it may be pointed out that these regulations are not any more restrictive or objectionable on account of their stringent nature than those of other towns where constant supply is given; that the last regulation practically allows the continuance of sound and efficient existing fittings, and that practical experience has shown that the actual cost per house, necessitated by the change from the intermittent to the constant supply, has been much less than was estimated. In the Kent Company's district the constant system has been introduced into portions of the district chiefly occupied by the poorer classes, and where the receptacle for storing the water generally has been a wooden butt placed in the yard, and frequently without a ball-tap or a cover. In these cases the company have merely required that a stop-cock be placed near the entrance to the premises to shut off the water in case of leakage, that a tap for drawing the water be placed in the house to supersede the butt in the yard. If there be a cistern and an overflow-pipe to the closet, the latter has to be removed or converted into a warning-pipe.

4344. Have you found any great expression of dissatisfaction or violent opposition in bringing that into effect?—No. In the way I have described, the company have proceeded to put the powers of the Act into operation, and they have completed all the necessary alterations without encountering an expression of dissatisfaction or opposition on the part of those who were affected by the change.

4345. And

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4345. And what was the cost of the alteration?—The average cost is estimated in the case of small cottages to be about 1 *l.* a house.

4346. Has that been the same throughout both the districts you have placed under constant supply?—Throughout the districts we have hitherto placed under constant supply.

4347. Then the statement which was made in one of the letters of the Metropolitan Board of Works, in which they stated that those regulations were so oppressive that they could not be carried out, you have found not to be borne out by the facts?—Quite so, when we put them into practice. I think, in the Board's Report to the public in 1873, it was stated that in the discussion upon the making of the regulations by the water companies, effect had been given to the arguments and objections of the Board, but that the regulations were still of a very stringent character, so stringent as to render it extremely improbable that the system of constant supply provided for by the Act can ever be brought into general operation while such regulations are in force. But it may be pointed out that although the 19th section of the Metropolis Water Act empowers the Metropolitan Board to request of any company an alteration of its regulations for the time being in force, and authorises the Board of Trade, or rather now the Local Government Board, to make, or cause to be made, inquiry as to the need of making any new regulations, and upon the report of the result of the inquiry to make any new regulations they may think fit; and although the same power of requisition for alteration of regulations is by the same section reserved to any 10 consumers of water supplied by the company, yet in neither case has any attempt been made to obtain an alteration of the regulations as originally confirmed and allowed.

4348. Now, I suppose in summing up your evidence you would say that you have assisted the fire brigade in extinguishing fires with the whole of your available resources, as a company?—Yes, I would say that the whole available resources of the company have been unreservedly placed at the service of the fire brigade for the extinguishment of fire.

4349. And that your company is prepared further to meet any of the views expressed by the Metropolitan Board of Works with regard to the increased safety of the town against fire?—I can only repeat the offer which has been made in the correspondence so frequently, that the company will be most happy to co-operate with the Board for that object.

4350. Whilst you recommend placing hydrants on the whole of your number of miles of mains which are at present under constant supply?—Yes, and I would add that the company's supply of water is amply sufficient to meet the estimated maximum demands for fire purposes in its district, and that any increase of delivery which the Metropolitan Board of Works may deem it advisable to ensure in any locality by the provision of a larger fire-main will be readily afforded on receiving an order from the Board to lay the necessary pipes at their own expense.

4351. Of course as long as the present intermittent supply is continued you are prepared to facilitate the arrangements which will enable the fire brigade to utilise that intermittent supply themselves?—Yes, quite so; the company have proposed to the Board as I mentioned, and they were desirous that some arrangement should be come to which would enable the fire brigade officers to help themselves to the supply of water, if that could possibly be done, by a system of marking the valves. I should say that the plugs throughout the company's district are not properly marked, and in many cases not perhaps marked at all, and in the case of one of these new hydrants which were laid down at Rotherhithe, though only so few months have elapsed since it was placed there, the material placed upon the road to make it up had completely covered the hydrant box, and it took some moments for the man who was aware of its position to find it by probing with the end of his iron rod.

4352. You have recommended, and would recommend, that the Metropolitan Board of Works should mark the position of those hydrants as well as of the fire-plugs?—We recommend that the position of the hydrants should be marked in some way, either upon the lamp-posts or upon the adjacent buildings, and that the position of the plugs should also be marked, and the position of the valves commanding the district under the intermittent service should also be marked. In that way they would be easily recognised, and would be made use of by the members of the fire brigade.

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4353. And all this would add to the facilities by which the fire brigade would be enabled to work the hydrants and get a supply of water for fire purposes?—Those arrangements would, as our company are advised and believe, greatly facilitate the obtainment of water by the fire brigade.

4354. You do not agree with Sir Joseph Bazalgette when he states, in answer to Question 5651, that he failed to see, looking at it from a fire point of view, what advantage hydrants would be, under the existing circumstances of your company?—No; the experience we obtained of these hydrants in the Kent Company's district would, I think, go a very great way to qualify that opinion of Sir Joseph Bazalgette's.

4355. Is there anything else you would like to place before the Committee in your examination in chief?—I do not recollect anything at this moment.

4356. Sir *James M'Garel-Hogg*.] In the commencement of your evidence you stated that there should be some systematic arrangement for calling the turncocks; what do you mean by that?—That there should be some plan arranged between the fire brigade and the company's officers, so that the turncocks' services should be obtained on the shortest possible notice.

4357. What would you suggest?—The arrangements which have been completed are those I described in my evidence as having been made by the company, namely, that the turncocks should live in close proximity to the fire-brigade stations, so as to be at the service of the fire brigade whenever a call was brought; that system has been found to work very well; I do not know that that could be greatly improved, except perhaps by the adoption of some arrangement about calling the turncock in the daytime. I believe that one of the water companies have suggested that some lads should be engaged by the fire brigade to run from the station to find the turncock on his beat if his services are required. So far as the Kent Company is concerned our arrangements are that the turncock should work from his time-sheet, and that his time-sheet should be fixed to the door of his house, so that upon any call being given, he not being there, his whereabouts can be easily ascertained at any time of the day.

4358. So that as regards the district you are speaking about, there is nothing further required in that respect?—At this particular time perhaps there would be nothing further required than the arrangements I have suggested with reference to sending for the turncocks at particular hours of the day.

4359. How long has the arrangement of putting up the turncocks near to the fire-brigade stations been in vogue?—It has been in operation some few years.

4360. You have done that since these different letters which the Board had to write complaining of the turncock coming late?—Yes, finding that no other arrangements had been effected we made that arrangement as being the most practicable.

4361. Do not you think that it was the duty of the Metropolitan Board of Works when a turncock came late, or there was no water, to send notice to the company and direct their attention to it?—As a means of enabling the company to ascertain whether their servants are doing their duty, it is very desirable that the Metropolitan Board of Works should make communications to the company when there is any great neglect on the part of their servants, but perhaps you refer to those words of mine in the evidence, that the company regarded some of the complaints of the Metropolitan Board of Works as unnecessary.

4362. You say that the company regarded some of the complaints of the Metropolitan Board of Works as unnecessary, but if the officers of the fire brigade arriving, found no turncocks; or the turncock having arrived, found no water, do not you think they would be wanting in their duty if they did not represent that to the company in whose district the fire occurred?—I think it greatly depends upon circumstances.

4363. Will you kindly answer my question; if the Metropolitan Board of Works had a report from an officer of the fire brigade that a turncock came late, or that the water supply was deficient for the purpose of putting out a fire, do you or do you not think that it was the duty of the Metropolitan Board of Works to communicate with the water company in whose district the fire occurred?—I think that in the absence of any arrangement made by the Board for the purpose of calling the turncock, and the fire not being such as to require his attendance, the complaints to which I referred were somewhat unnecessary.

4364. You

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4364. You think that in the case of an inefficient supply and in the absence of the turncock, the Board ought not to have apprised the company of that deficiency?—If the water is not needed, I do not think it is necessary to inform the company that there is no water.

4365. I am assuming that water is necessary to put out a fire?—Water is generally necessary to put out a fire, but in the particular case to which reference is made in that letter to which I have referred, the fire had been extinguished by the owner of the premises with one bucket of water.

4366. I am not referring to any particular fire, but to the subject as a whole; do you or do you not think that the Metropolitan Board of Works having had it reported to them by their officers who attended the fire that the turncock was absent or late, or the supply of water deficient, ought or ought not to let the company who have charge of that district know of that neglect?—I think as I have endeavoured to explain, that the continued complaints of the absence of the turncock at small and trivial fires, in the absence of any systematic arrangement having been made by the Board to secure their attendance, may be regarded somewhat in the light of being unnecessary.

4367. Will you tell me into what categories you divide the cases; when you think the Board ought to give notice, and when they ought not to give notice; what sort of neglect do you think the Metropolitan Board of Works ought not to give notice about?—I think if the Metropolitan Board of Works had made an arrangement for securing the attendance of the turncocks, and had found the turncock did not attend properly, they would have been quite justified in complaining of the irregularity of the turncock's attendance.

4368. Do not you think it is the business of the water companies to have their turncocks always ready?—The companies do, as a matter of fact, endeavour to secure the attendance of the turncocks at the earliest possible moment,

4369. That being the case, do not you think it is rather a benefit to them, when they have done everything they can to get their turncocks in time, to let them know when the turncocks fail in their duty?—But you must recollect at that particular time there was no systematic arrangement for calling the turncocks. I quite admit that it is desirable when a systematic arrangement has been established, that the companies should be made aware of any dereliction of duty by their officers.

4370. But I think your directors here object to it; they complain that they do not see the use of calling their attention to these matters?—I have endeavoured in my explanations to give expression to the same opinion as my directors then entertained.

4371. In answer to Question 4060, you stated in regard to the fire in Trinity-square, as to which there was a complaint of a short supply, that close by there was a main constantly charged?—There was.

4372. Was your turncock there?—I believe so.

4373. Then if there was a main and plenty of water there, and knowing that to be there, why did he not represent it to the fire brigade and give them the advantage of it?—He could not give them the advantage of the water in the main, because the Metropolitan Board of Works had not provided the proper plugs upon the pipe to enable the water to be used.

4374. It is not our business to put plugs on, is it?—I apprehend it is the duty of the Metropolitan Board of Works in any district to put on proper appliances for getting at the water.

4375. It is not our business to put plugs on, is it?—Yes, and a "plug" under the definition of the Act of 1871 is now made to include "hydrant."

4376. There was no plug on the main?—There was not a plug on the main; there was a plug on the service-pipe in connection with the main, and the water was taken from the service-plug.

4377. But the main close by was constantly supplied, and you would get the water from that?—Yes, but you could get a great deal more water from a hydrant upon an 8-inch main than you would from a plug at the end of a long service-pipe 3 inches in diameter.

4378. What was the length of the service-pipe from which the water was obtained from the plug?—It was, as near as I could say, about 300 yards.

4379. Now, going to another part of the question, did not Captain Shaw recommend the discontinuance of the intermittent supply, and did he not also recommend a constant supply, and a sufficient number of hydrants?—Yes;

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Captain Shaw made those recommendations in his Report of 1866 as being the best means of overcoming the inconveniences which then had been sustained in getting water at fires.

4380. Then what is the use of hydrants if there is not a sufficient pressure on the mains?—The use of the hydrant has been very amply stated, I think, by Captain Shaw in one of his reports which was appended to the papers of last year, a report which, I think, was submitted to the Metropolitan Board of Works by yourself and Mr. Richardson. It says: "And first it will be well to clear up a doubt which we have reason to believe largely exists, and that is whether Captain Shaw, the responsible officer of the fire brigade, is of opinion that if hydrants with standposts were provided throughout the metropolis after the establishment of a constant supply of water, those hydrants would be an efficient substitute for fire-engines. In reply to this question, which we distinctly put to Captain Shaw, he expressed his belief, a belief shared, he said, by all skilled firemen, and warranted by experience, that hydrants with stand-pipes placed at suitable distances throughout the metropolis on mains constantly charged with water at high pressure, would render unnecessary the use of fire-engines save in the case of fires of exceptional magnitude, or of fracture or damage of the pipes."

4381. That is exactly what I wanted to ask you; that there should be a constant supply to make hydrants really useful without the necessity for engines?—When the Committee of 1871 ordered hydrants to be put upon pipes under constant supply, I do not think it was the question before them whether hydrants would enable the Board to supersede engines or not, but it was put to the Committee, if I remember rightly, that those hydrants afforded considerable facilities for the ready obtainment of water in the early stages of a fire, and in that way would be of considerable benefit, enabling the fire to be extinguished before the arrival of the brigade.

4382. You would advocate that irrespective of cost?—I think hydrants must necessarily accompany the system of constant supply.

4383. Can you state what quantity of water was being delivered through the jets you spoke of in the experiments you made?—I gave the delivery in four instances of those experiments which were made last Wednesday afternoon; in one case 135 gallons a minute, in another 187 gallons, and in another 200 gallons a minute.

4384. Have you ever made experiments with 40-feet pressure passing 150 gallons a minute through 200 feet of hose?—No.

4385. Referring to your column of pressure, supposing a fire to occur which would require 2,000 gallons a minute to be drawn off, how much would the pressure fall in consequence?—That would depend upon the head in the first case, and upon the size of the pipes delivering the water in the second, and upon other circumstances; that is an engineer's question, and I should not like to attempt to answer it.

4386. Will you tell me what is the pressure in the constantly supplied parts of the Kent Company's district which could be relied upon as being uniform in case of a fire occurring?—If you take the reading in the case of the Plumstead constant supply district, there you have a reliable pressure maintained throughout the night of about 150 feet, and in the Rotherhithe district the same results would occur.

4387. Then you could not tell me, supposing a fire occurred, how much that would be diminished?—No; it would diminish in various ratios, depending on the situation of the premises on fire, and the disposition of the pipes.

4388. *Chairman.*] Being supplied by gravitation, would it fall off until the body of the water in the reservoir had diminished?—No, not unless the draught was greater than the capacity of the pipe could sustain.

4389. Sir *James M'Garel-Hogg.*] You stated that Sir Joseph Bazalgette was inaccurate in some of his testings; I did not quite understand how you proved that he was inaccurate?—I do not think I went so far as to say that Sir Joseph Bazalgette was inaccurate in any of his testings. May I ask if you refer to his statement of the pressures?

4390. I understood you to say that the testings were inaccurate, and you then tried to explain them; but do you adhere to the statement that Sir Joseph Bazalgette was inaccurate?—In Sir Joseph Bazalgette's statement of the readings taken in the constantly supplied district, I think there is a little inaccuracy, as

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as I have explained. We find, according to the return which we have had from Sir Joseph, that the pressure varies in the constantly supplied district from 26 lbs. to 70 lbs. Sir Joseph Bazalgette, in his evidence, referred to the pressure of the Kent Water Company's constantly supplied district as varying from 20 lbs. to 48 lbs., and to that extent I said that Sir Joseph Bazalgette's observation was inaccurate.

4391. How do you know that the tests which he made, or which were made by efficient people, were inaccurate?—I do not say that the readings of the pressures were inaccurate, but I only say that upon there turn with which Sir Joseph Bazalgette has furnished me, this statement to the Committee of the pressures found in the district was inaccurate, that is to say, that on the return there are pressures recorded of from 26 lbs. to 70 lbs. in the constantly supplied district.

4392. *Chairman.*] What you ventured to say, I understand, was that Sir Joseph Bazalgette's evidence before the Committee, a little further on, showed that that statement must be inaccurate from his own point of view, because he had stated to the Committee that there were three or four instances in which the pressure rose to 60 lbs., and therefore the maximum could not be 48 lbs.?—Yes, quite so.

4393. Sir *James M'Garel-Hogg.*] Therefore, at all events, you do not mean to say that Sir Joseph Bazalgette in these testings was inaccurate?—I do not mean to impugn the correctness of his observations in any way. I have no means of knowing whether they are correct or not. No doubt they are correct.

4394. I gather from you that the observations which you and your engineer have made, do not quite agree with Sir Joseph Bazalgette's?—What I mean is that Sir Joseph Bazalgette in stating the results he found in the district was inaccurate on his own return.

4395. Now going to another point, I think there was a short supply of water, was there not, at the King and Queen Granary fire?—I am not aware that any representations were made to the company on that account, but I have heard it stated that the supply of water on the land side was considered short.

4396. What is the general size of the pipes in that district?—The main running up to Rotherhithe-street is a 12-inch main, diminishing to an 8-inch main, then to a 6-inch, then to a 4-inch, and terminating in a 3-inch pipe, and the terminal point of the 3-inch pipe is about opposite the King and Queen Granary premises.

4397. You stated, I think, in your evidence in chief, that there was one place in which there was no pressure at all at night?—That was an instance where Sir Joseph Bazalgette had reported that the day pressure had altogether disappeared at night, and I explained that the hydrant from which the observation was taken was upon the company's pumping main into the reservoir at Shooter's Hill, and that that was not a constantly charged main, because it was not under pressure when the engine ceased working.

4398. Supposing a fire took place there, what would you do?—I do not know the arrangements which exist for the supply of water at night to that district, but I am under the impression that there is a main in that district from which water could be turned on into the service pipes. I do not think the pipe from which the observation was taken is the service pipe of the district, and a fair supply could be had from the service pipe of the district in case of a fire.

4399. Are there any other such districts exactly in the same circumstances as Eltham in that respect, that is to say, without water?—Eltham is not without water; there was a hydrant placed upon the pipe in question, to enable the road authorities to get their water during the day, but that is not the service pipe of the district.

4400. You stated that the charge for fittings was 1 *l.* per house; that varies very much from Mr. Greaves. He said he thought it was 6 *l.*?—I do not recollect that observation from Mr. Greaves. I understood that the cost in the East London district was not quite so great per house as that which I have named to the Committee, as the cost in the Kent district.

4401. You are speaking only of small houses?—I am speaking only of small houses.

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4402. And you did not find any difficulty in getting the change made from the intermittent to the constant supply?—The company did not find any difficulty.

4403. And no complaint?—No complaint was made to my board, except that Mr. Richardson and another member of the Greenwich Board of Works waited upon the directors soon after the regulations were made, and requested them not to proceed with the introduction of the constant supply system into the district of his board until the regulations had been altered. I think that is the only official representation which has been made to the company on the subject.

4404. Was that before the Committee presided over by Lord Methuen?—No, that was after the regulations had been confirmed by the Board of Trade. Mr. Richardson and the clerk of the Board, and another member, came as a deputation to the company asking them to postpone the introduction of constant supply into the district of the board pending the alteration of the regulations, but I am not aware that any steps have been taken to secure the alteration of the regulations in any respect.

4405. The constant supply was immediately carried out, was it not?—It was carried out and with success in the Rotherhithe district, and also in the Plumstead district, and the company are about to put another portion of their district in Peckham under constant supply; and I may also add, on the other hand, that the Plumstead Board of Works requested the company to introduce constant supply under their existing regulations in part of their district.

4406. Could not your company supply the whole quantity which Captain Shaw says is necessary for fire purposes?—The company could supply it if the pipes were large enough to carry the water.

4407. But the pipes are not large enough to supply it?—Not in all places; there are a few places in which they would be.

4408. To supply that it would require to relay the mains?—It would require a relaying of some mains if there were to be a delivery of 2,000 gallons a minute of water for fire purposes in all parts of the district; but I do not know where the property is situated in the Kent Company's district which would require that large supply. Of course there are those large premises in Rotherhithe-street, but I have pointed out that there has been no application from the metropolitan authority or the owners of them to the company for an increased supply.

4409. And you think the Metropolitan Board of Works or the local authority should meet the cost of extra pipes?—Certainly, I think it is the duty of the Metropolitan Board of Works or the owners to meet the cost of the provision of increased water supply for fires. The effect of the Act of 1847 was to empower persons to take water from the pipes of the company in case of fire, and required the company to provide pipes to convey such water as is necessary for the domestic purposes of the inhabitants, but the companies are not required to provide any other water than is sufficient for the domestic supply of the inhabitants. On the other hand they would gladly afford the means to the Metropolitan Board of Works for having an increased supply of water in the district, if the Metropolitan Board of Works would give an order for laying down the necessary pipes.

4410. And if the Metropolitan Board of Works will undertake to pay for it?—Yes.

4411. You think that the Metropolitan Board of Works should pay for the extra piping?—I think so.

4412. That would be a considerable addition to the cost of hydrants?—That might be a large addition, but on the other hand the Board have the statement of their officer, Captain Shaw, that in the majority of instances the present supply is ample.

4413. Have not the water companies certain privileges and districts to themselves to which they supply the water; London is divided into a certain number of water districts, is it not?—Yes. I believe each company has power to supply water in the several parishes included within the limits of its Act.

4414. If they have certain privileges, do not you think they have certain duties also?—No doubt they have certain duties, and I think those duties have been well carried out.

4415. Have you estimated at all what would be the cost in your district of relaying the pipes and supplying water for fires upon a larger scale?—No; that would

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would depend entirely upon what alterations the Metropolitan Board of Works thought necessary.

4416. But I mean to carry out Captain Shaw's requirements where you say you could not otherwise supply the amount of water you think necessary?—I think if the Metropolitan Board of Works were themselves to serve the Kent Company's district they would not think it necessary that any alteration should be made over a large portion of the district with a view to providing a supply of water of 2,000 gallons a minute. I think they would come to a conclusion that that supply was not required.

4417. But Captain Shaw says it is?—Captain Shaw says it is required to meet the cases of very large fires, but that pre-supposes the existence of very large premises which can take fire and burn, and upon the Kent Company's district every large property, such as the War Office and Government property, is separately protected as I have pointed out.

4418. You state that Captain Shaw was perfectly satisfied with the test of the hydrants in Rotherhithe which the Board have put down; where did he state that?—He stated that in my hearing on the occasion of the experiments being made. A pressure guage was put on to a hydrant in York-street, and the reading taken was 50 lbs.; some one asked "Was that sufficient?" and Captain Shaw said, "Yes, it is a very good pressure; sufficient for our purposes."

4419. That was for that district?—I cannot say what reservation he may have had in his mind, if any.

4420. You say the company had some arrangement made to prepare?—A communication was made to the engineer that the Board would come to make those experiments, but I think with regard to the insinuation that any special arrangements had been made, the same remark might have been made with regard to Manchester or Liverpool, because the authorities were equally aware that the committee of the Board was coming down, and they might have been just as much prepared for them there; but in most of those cases the results of the experiments, and they do not differ materially from those which were made in the Kent Company's district, and they appear to have satisfied the Metropolitan Board of Works in those places, whereas in our district they do not appear to have given satisfaction.

4421. Do you think the results of your experiments have been at all equal to what satisfied the committee in Manchester and Liverpool?—I see from this Return that water was thrown to a height of 50 feet in Liverpool. I may point out that on these experiments being made in the Kent Company's district, the water was thrown over the top of a staff 60 feet high; and I apprehend that if the 50-feet jet was satisfactory in one case, 60 feet would be satisfactory in the other.

4422. But that would be only the feathering in that case, would it not?—I can only say that I went last year and had a hose put to that hydrant, and measured the height of an effective jet of water against another flagstaff in the neighbourhood, the flagstaff on the opposite side of the street, against which the experiment, in the presence of the members of the Board, was made having been removed. The height of the newly-erected staff was 60 feet, and the water was thrown in great bulk to a height of 60 feet on that morning, notwithstanding the prevalence of a very high wind. The main supplying that portion of Rotherhithe where those experiments were made is supplied from the same reservoir as furnishes the fire supply for the Royal Victoria Yard at Deptford. The police there are in the habit of taking readings of the gauge from day to day, and they know exactly what variations of pressure take place, and had the Metropolitan Board desired to ascertain the facts about this special arrangement they might have gone to the yard and ascertained what the variations of pressure were from time to time. Of course the hydrants are there now, and can be tested at any time.

4423. Do you contend that your pressure is as good as it is at Manchester, and your supply too?—I do not say the Kent Company's pressure in all cases equals those of Manchester and Liverpool. I say that in some cases it has equalled the results which are reported in this pamphlet; and as those results appeared to be satisfactory to the Board, I can hardly understand why similar results found in the Kent Company's district should appear to impress the Board unfavourably. There are some experiments reported from Liverpool; "by a 2-inch hose attached to a 5-inch main jets were thrown through 7-8ths and

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1¼-inch nozzles above the roofs of houses which were 56 feet." The pressure in the Kent Company's main, as I am informed, at the Royal Victualling Yard, will enable the water to be thrown on to the top of the buildings in the Government Yard to a height of 80 feet.

4424. At the same time you do not contend that that is as good as Manchester or Liverpool:—In some respects. Manchester is very favourably situated with regard to pressure.

4425. Sir *Henry Peek.*] May I ask you whether the quality of the water supplied by you is the same from all these reservoirs?—Yes; the Company only distribute one quality of water for all purposes.

4426. One of the companies stated that in some districts they supplied unfiltered water for cleansing purposes; you do not do that?—No.

4427. Is yours all filtered?—No; the Kent Company's water does not require filtration; it is from deep wells in the chalk, and is sufficiently pure without filtration, but that water is supplied generally throughout the district for domestic purposes and for fire purposes.

4428. You seem to have studied very carefully the evidence which was given before this Committee last year, and, no doubt, your attention was specially called to that fire at the King and Queen Granary; is that your district?—Yes; the King and Queen Granary is in the Kent Company's district.

4429. Which of these seven of your reservoirs would supply that water?—The Greenwich Park Reservoir, with a capacity of a million and a quarter gallons.

4430. Of course, having read that evidence, you are aware what great damage that fire did, owing to the want of water; that is to say, it occurred at five o'clock in the morning at low tide, when the floating engines could not get near the place, and the fire-engines could get no water?—The fire-engines, I think, had all the water that could be obtained from the pipes in the street. There was no short supply of water in the nature of a supply at the reservoir. The company had plenty of water for use at the fire, and that would have been at the service of the brigade had the pipes been large enough to convey the water to the spot.

4431. If I understand you aright, the pipes along that part of your district are altogether insufficient?—The pipes in the Rotherhithe constantly-supplied district in which those premises are situated are amply sufficient for the domestic supply of the district.

4432. But wholly insufficient for any fire purposes?—They apparently would not convey the quantity of water which Captain Shaw's requirements would involve.

4433. Would you be so good as to look at Question 6445 in last year's evidence, which gives rather a graphic account of that fire; Mr. Lovell says: "The water service is notoriously bad all along both sides of the river," and then half-a-dozen lines further down he says, "The mains are very small, and the service very little"; in fact, altogether, Rotherhithe is principally composed of large waterside premises, and is practically, except from the Thames, without any water supply in case of fire?—This fact has been, I think, previously referred to in the Committee on Fires of 1862, and again in the Committee of 1867, but up to this time no steps have been taken by the local authority with the view of providing a larger service of water in case of fire on the land side.

4434. Then that fire at the King and Queen Granary having attracted so much public attention, and as a great deal of correspondence appears to have passed between your Board and the Metropolitan Board of Works, let me ask did any pass on that subject?—I am not aware that any correspondence passed between the company and the Board on the subject of this fire at the King and Queen Granary.

4435. Yet that, and the Campbell's cooperage fire, to which you referred, were both as serious fires as you have had on that side of the water for a long time?—I do not know the character of the fire at Campbell's cooperage, but the main passing there is an 8-inch main, and inasmuch as an 8-inch main was, when the hydrants had been placed upon it, sufficient for the fire at Gabriel's Wharf, I assume that if the same main had been available at Campbell's cooperage there would not have been any cause of complaint. The King and Queen Granary is situated further down the same street as that which we have been referring to; the main then diminishes from the

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the 8-inch, which I have mentioned, to the 6-inch, and then again to the 4-inch pipe, and then a short length of 3-inch pipe, and the King and Queen Granary premises are situated where the 3-inch pipe passes along at the extreme point of the company's district shown upon the map.

4436. So that 3-inch pipe would have been altogether insufficient to have supplied water commensurate with such a fire as that?—No doubt, Captain Shaw having to bring a large number of land engines there, would not have been able to obtain the water for his service from a 3-inch main; it would require a much larger pipe; I have already stated the diameter of the pipe which the company's engineer thinks would be necessary to convey the body of water to that district which Captain Shaw's requirements would involve.

4437. Do you agree with Captain Shaw, that 2,000 gallons a minute is a reasonable requirement? — In some districts, no doubt, it is a reasonable requirement, and it is met by the present appliances; but in the greater part of the Kent Company's districts (I use the criticism with all deference), I do not think it is a reasonable requirement, but is far in excess of any requirement which is likely to arise.

4438. Do you think Captain Shaw's requirement of 2,000 gallons a minute is out of proportion for the Rotherhithe district?—No; I will not say that, and no doubt at a fire on these large premises he would like to be able to bring a large number of his engines to bear. In the case of the fire at Gabriel's timber yard, the water supply was sufficient for the number of engines which the brigade thought it necessary to use.

4439. The King and Queen Granary fire was a very heavy fire, and required to be pumped upon for a long time, and it appears to me that if Captian Shaw could have taken 120,000 gallons an hour out of it your Greenwich reservoir would have been almost insufficient, would it not, to supply that and all the district at the same time?—No, taking the 2,000 gallons a minute, I think, in round numbers it would consume somewhere about 3,000,000 gallons in 24 hours.

4440. *Chairman.*] What is your pumping delivery into that reservoir?—A possibility of 6,000,000 gallons in a day.

4441. Sir *Henry Peek.*] As I understand, you keep your districts entirely distinct, Woolwich, Constitution Hill, Greenwich, Plumstead, Deptford, and so on; all these reservoirs supply their various districts, but have you any means of joining those reservoirs together?—They are used in common for the lower portion of the district.

4442. You can put two or three reservoirs into one supply?—Yes.

4443. I understood you to say that your fittings were not strong enough, and that that was the reason why each district must depend upon its own reservoir? — My answer was directed to a question put to me by the Honourable Chairman as to the policy of letting down water from the higher level reservoir to the lower district. The high level resorvoir on Woolwich Common has its particular district; the lower reservoirs have their particular districts to supply; they could be supplied from the higher reservoir if it were necessary; but then merely turning on the water from the higher level reservoir into the lower level district would not give the statical pressure from the high level reservoir, unless the connection with the lower level reservoir were severed, because otherwise the water would merely run out of the one into the other, and I think that explanation would also apply to the suggestion of putting the pressure of the whole of London under the highest level reservoir. You could not make use of the highest level reservoir of a district unless you shut off the lower level reservoir, because if the reservoirs were connected the water would run out of the higher level reservoir into the lower level reservoir, as I have just indicated.

4444. You stated that the source of your water was from the chalk, and in that respect different from that of other water companies; but is it held to be purer and generally better for domestic purposes or otherwise?—Professor Frankland in his report usually takes the Kent water as the standard of purity for the purpose of comparison between the water supplied by the different companies. The character of the water supplied by the company is very high; it is regarded as a very pure water. The New River Company comes very near to our standard at times. Sometimes they pass us, I think, but the character of the Kent Water Company's water stands very high. As between ourselves and the New River Company (I do not wish to detract from

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the New River supply in any way), their pressure is generally regarded as very satisfactory, but I should only say, as regards the observations taken by Sir Joseph Bazalgette generally, that they give the Kent Company on the average, a higher pressure throughout the various levels of their districts.

4445. Mr. *Onslow.*] Do you consider that the dockyards of Woolwich and Greenwich are sufficiently protected at the present time?—I would like to give the Committee Sir Richard Mayne's opinion upon that point in the evidence which he submitted to the Committee on Fires which sat in 1862.

4446. But that is 15 years ago; do you know anything about it at the present time?—A similar arrangement exists now as existed then; the Government establishments were supplied then from the same reservoirs, or from reservoirs in the same places.

4447. Had they as many hydrants then as they have now?—That I cannot say; I do not know what the arrangements were at that time with regard to hydrants, but I know, from having read the evidence which was given by Sir Richard Mayne, that in his opinion the water supply in case of fire at the Government establishments was very satisfactory.

4448. What is the usual amount of pressure at the Woolwich Dockyard?—At the Deptford one it is 65 lbs.: at Greenwich Hospital it is 65 lbs., and at Woolwich, I am told by the engineer, it is 75 lbs.

4449. There is sufficient pressure provided you attached a hose to a hydrant to send a jet of water over the highest house there?—Yes; in the Victualling Yard at Deptford the fire brigade state that they can get water up to the roofs of buildings 80 feet high, and as I stated to the Committee at an experiment which I saw made in Greenwich Hospital, water was thrown on to the roof of the chapel; I do not know what the height of that is, but I should think it was not much, if anything, less than 80 feet.

4450. Do you know at what distances apart the hydrants are situated which are put down to protect the Government property at Woolwich?—I do not know that.

4451. In what district is your pressure the lowest?—That I cannot tell; that would depend, I think, upon the elevation of the premises in their respective zones.

4452. Is there much valuable property where the pressure is low?—No.

4453. No wharves nor storehouses?—No; the pressure available upon the riverside would be the pressure from Greenwich Park Reservoir of 160 feet elevation.

4454. When the Metropolitan Board of Works paid you for putting down those hydrants, did they send one of their officers to see that they were in their estimation properly placed, or did they take your word that they had been placed in suitable localities?—When the work was completed, the Metropolitan Board of Works sent an officer to see as to the erection of those hydrants, and formally took them over from us; that is to say, we pointed out to the officer of the Board those 61 hydrants which the company had erected.

4455. Then we may take it that they approved of the way in which those hydrants had been laid down and the positions which you had accepted as the best?—With regard to the way in which they were laid down, we have had no representation of their being unsatisfactory in the opinion of the Board, and with regard to the distances at which they were placed apart, we sent a plan to the Board before proceeding to do the work, and suggested that if they had any suggestions to make the company would pay every attention to them.

4456. I think you stated that you are bound to maintain a certain head of water at the Woolwich reservoir by the Government?—Yes, and at the Greenwich Park reservoir also.

4457. Who undertakes the duty of seeing that that arrangement is carried out on behalf of the Government authorities?—The engineer of the company reports to the directors the volume of water in those reservoirs.

4458. Has the Government ever sent an inspector to look at it?—I do not know as a matter of fact whether they have or not, but I have no doubt they have, because they pay very great attention to the arrangements for fire purposes at Woolwich.

4459. As far as you know the policy of carrying out the arrangement rests with your engineer solely?—I do not think it rests with him; he is under orders from the Board to see that that head of water is maintained in the reservoir; and it

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it is open for the Government authorities if they saw any neglect on our part to point that out, and I have no doubt that they would immediately do so if they saw any apparent neglect, because as I say, they scrutinise the arrangements for fire extinction very closely.

4460. But they have never pointed out any defect in that respect?—No, I am not aware that there has been any defect in that respect.

4461. Supposing that the proprietor of any place of public amusement were to ask you to lay down a hydrant close to a hall or building, whatever it might be, you would at once carry out his suggestion, I presume?—Yes, if the proprietor of any place of public amusement applied for any supply of water for fire purposes, we should readily afford it upon the usual terms and conditions: a meter would be put upon the service commanding the supply, and he would pay for the water taken.

4462. Are you aware whether any music halls have applied for that privilege?—Not one; we have very few such places in the neighbourhood; there are only four places of public amusement which could be regarded, I think, as legitimately coming within the scope of this inquiry; there are two lecture halls and two theatres, one of them being the small Greenwich Theatre.

4463. In neither of them is there a hydrant?—Not inside.

4464. Is there any one close outside?—There is a 12-inch main passing in front of the Greenwich Theatre, and there is a hydrant a few yards distant.

4465. But inside the Greenwich Theatre there is no hydrant?—There is not to my knowledge. Some reference, I think, was made on the previous occasion of my examination to the company's allowing people to have hydrants inside their premises. At Manchester, where the water supply is in the hands of the municipal authorities, they do not allow the erection of any fire-cocks inside the premises; they allow the use of private standposts and hose from street hydrants upon application; at least, I gather so from their regulations.

4466. *Chairman.*] With respect to the question of the Honourable Baronet the Chairman of the Metropolitan Board of Works, in which he asked you whether the Companies, having certain privileges granted them, had not certain duties also imposed upon them; I imagine that your duties as a company are specified in your Act of Parliament?—Yes, entirely so.

4467. And those duties which the Act of Parliament created are to supply a certain amount of water for the domestic use of the inhabitants?—Yes.

4468. Combined with that it was made a duty to give gratis any amount of water out of the pipes which you had laid down for your domestic services, for the use and benefit of the public in extinguishing fire?—Yes; the obligation imposed upon us by the General Act of 1847 was to allow persons to take water from the company's pipes gratuitously for the purpose of extinguishing fire.

4469. There is no obligation upon you to lay pipes in any given direction which may be pointed out as advantageous for the extinction of fire, unless it is connected with your existing domestic supply?—Quite so. I am not aware that we are called upon to lay down a special service for any other purpose than domestic supply.

4470. Therefore it is distinctly the duty of the local authority who may be entrusted with the protection of the town from fire, if they consider a part of the town to be unprotected to lay down such mains in communication with those of your company as may adequately protect that district?—Quite so. I regard it to be so, and I think that must have been the opinion of the Committee according to that paragraph of their Report to which I have referred relating to the provision of larger pipes in any particular localities where they were needed.

4471. Therefore that evidence which has been given to this Committee about the notoriously bad supply of water for fire purposes along the banks of the river does not affect the case in the least, because they have supplied whatever water was required for domestic purpose to the fullest extent?—Yes, the companies have entirely carried out the obligations which the Act imposes upon them for the domestic supply of water in the district; and I think it remains with the metropolitan authority or with the fire brigade authority to request that a larger supply should be given in any district if it is wanted for fire purposes, and that they should pay the attendant expenses as contemplated under the General Act.

4472. But your domestic supply of those districts is given to such a limited extent because, as Mr. Lovell said in part of his evidence most of the people

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preferred dipping their pails into the river to paying any rate for the water?—I do not know whether they drink much river water, but there are very few inhabitants in that parish on the bank of the river where the company supply, and their requirements do not call for larger pipes.

4473. The duties of the company are limited to the domestic supply, the supply for fire-brigade purposes belonging to another authority who are entrusted with the protection of the town?—Quite so. I am not aware, certainly, of any obligation upon the company in respect of the supply of water for any other purposes than for domestic service. I believe that the obligation to provide for an increased supply of water for fire purposes rests entirely upon the authorities of the Metropolitan Fire Brigade.

4474. All the obligation laid upon you by the statute is, that wherever your domestic supply is being given, there you shall allow a supply of water for fire purposes without payment when required?—That is the obligation upon the company.

Mr. *Charles Greaves*, re-called; and further Examined.

Mr. *C. Greaves.*

4475. *Chairman.*] I UNDERSTAND you wish to produce the report of the turncocks with regard to a question which was asked you as to the way in which they were signed and verified?—I should like to do so, and to that end I have brought the whole of last year's private reports from the turncocks to the company respecting each fire, in order to show that there is no reason why they should be doubted in any way. (*The same were handed in.*) They are all countersigned before they reach the company. I see in February 1876 we have one report which is countersigned by the superintendent of police. Some of them are countersigned by the members of the fire brigade on duty; on other occasions they are countersigned by the engineer of the fire engine; occasionally by other people, but always so that we have reason to believe, that the signature is that of a respectable person, they answer our purpose.

4476. That is why you feel justified in stating that these reports of the turncocks are reliable?—Quite so. I thought I might have over-stated the case in saying that they were certified by the brigade. I would not go so far as to say they are certified by the brigade, but they are countersigned here and there at the foot by members of the brigade; and if the brigade being asked to put a signature wished to make a remark with regard to the supply of water, they would have the opportunity on the report itself of making any observations with regard to a deficiency of water.

Mr. *Thomas Hack*, called in; and Examined.

Mr. *T. Hack.*

4477. *Chairman.*] I BELIEVE you are the Engineer of the West Middlesex Water Company?—I am.

4778. How long have you been with the company?—For upwards of 20 years I have been connected with the company; I have been engineer for the company since December 1875.

4479. You were assistant engineer before that, were you not?—I was for several years.

4480. Can you describe to the Committee the heights of the reservoirs of your company?—Yes; the brown line on the plan represents the boundary of the metropolis, this is the Hammersmith, this the Kensington, this the London district, and this the North-west district (*pointing to the plan*). The blue lines on the plan represent the constantly charged mains throughout the different districts.

4481. What reservoirs have you in those districts?—We have three service reservoirs at heights respectively of 124 feet, which we call the Kensington Reservoir; the Barrow Hill Reservoir, 190 feet, andt he Kidderpore Reservoir at an altitude of 323 feet; those are always available for use in case of emergency; the reservoir in the higher district can be made to supplement the supply in the lower district.

4482. When

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4482. When you say, "can be made to supplement the supply in the lower district," do you mean that you get in the lower districts the pressure which your highest reservoir will give?—We can do so.

4483. Can you, in your district, give that additional pressure without any danger to the system of pipes?—No; there would be a danger to the lead pipes; to our iron pipes I do not apprehend there would be any danger, but I have no doubt it would burst a good many of the domestic service pipes.

4484. How are your reservoirs supplied?—By pumping engines. We have at Hammersmith six pumping engines; four engines always working by day and three by night, to keep up the high pressure of the district.

4485. Where do you pump from?—The water is pumped from Hampton, in the first place, to our filter beds at Barnes, and then it flows by two 36-inch conduits to the pumping wells at Hammersmith.

4486. The pumping well you are describing is the pumping station in the town itself?—Yes.

4487. You are able, therefore, to bring to bear the whole of your six engines, if required, either by day or night?—That is so. If a fire should occur at any time to reduce the pressure, we have two engines to spare by day and three by night, which we could immediately start to keep up the pressure within the district.

4488. Do your servants live at the works?—They do.

4489. So that at night they can ascertain at once whether additional engine power is required?—They do. We have six houses where the men live at the beck and call of the works; we could send for them immediately.

4490. Can you give the holding power of your three reservoirs?—The Kensington Reservoir contains 3,672,000 gallons, the Barrow Hill Reservoir contains 4,750,000 gallons, and the Kidderpore Reservoir 2,500,000 gallons.

4491. That is the highest one, and with 323 feet of fall?—Yes; the total capacity is 10,922,000 gallons.

4492. How does your delivery power compare with your actual requirements for supply?—Our greatest delivery is 10,000 gallons a minute; that is the greatest amount required in the district, but we have a power equal to 13,129; say 13,100 gallons per minute; a reserve power to that extent.

4493. So that you have over 3,000 gallons a minute in excess of what you actually supply?—Yes, quite so.

4494. Is that the same by night?—No; by night we have very much more; we have an excess equal to 7,000 gallons a minute during the night, and the whole of that could be made available in case of emergency.

4495. Can you give any instance of fires in your district which were put out by water through the stand-pipes?— Yes, I can go as far back as 1873, when, on the 28th of June, there was a fire at 55 minutes past 4 in the morning, at Gloucester-road, Regent's-park, at a Government telegraph stores.

4496. That fire was put out with the pressure which your services gave?—That was put out with the pressure which the services gave.

4497. Without the aid of engines?—Five engines attended that fire, but they did not work; the company's pressure put out the fire; the Ordnance level was 100 feet, and the pressure which we had was 60 feet, and a length of hose of 160 feet was used; and the height of the jet was something like 50 feet available at that fire. Upon the 17th of July there was another case of fire at a quarter to three, at No. 1, Weymouth-street, Portland-place, at which two engines attended, but the company's pressure, through the aid of hydrants, put out the fire; merely a dummy knocked into the plug, with two branches of hose upon it; there we had a height of 60 feet jet through a length of 80 feet of hose, and the Ordnance level there, I should say, would be 64 feet, and the company's pressure would be something like 80 feet.

4498. At those fires which you have been quoting, which you say you were able to cope with without the use of engines, I suppose the water was not applied to the fire before the engines of the brigade came?—I do not know that they were in those two cases which I have just mentioned, but further than that, I shall be able to state the number of fires which have occurred where the turncocks arrived before the engines had arrived. On the 22nd of March 1874, I had another case which occurred at a quarter to five in the morning, at a coal depôt in the London and North Western Railway at Chalk Farm, at which four

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engines attended, and the fire was put out through the company's pressure through a length of hose of 160 feet.

4499. With a stand-pipe?—Yes, with a stand-pipe fixed in a plug.

4500. Was that stand-pipe brought by the brigade? — Yes; it was an ordinary copper stand-pipe; what we call a "dummy."

4501. And without using the engines there, the pressure was sufficient?—Yes. Then again upon the 10th of April, at 11, Beaumont Mews, a fire occurred in a stable, at which four engines attended, and the pressure was 110 feet there, and that was put out in that manner, and the height of the jet was 50 feet.

4502. When you state that you had a pressure of 110 feet, how did you test that pressure?—By taking the difference between the altitude of the Ordnance level and the company's reservoir.

4503. You knew the height at which you were delivering, and you took the height of the fall from the reservoir?—Yes; that gave the actual pressure.

4504. And that therefore was before it went into the hose?—It was before it went into the hose, no doubt.

4505. Now what was the next?—Upon the 14th May at 20 minutes after 10, in St. Peter's-road, Hammersmith, a fire occurred at a carpenter's shop, and one engine attended. The pressure at the time was 175 feet, and the Ordnance level was 19. It was at a low part of the district. We had a length of hose of 200 feet through which the water was delivered, and the height of the jet was 20 feet, but it was only a carpenter's shop, and it was not necessary to throw it any higher. The next case was on the 10th October, at two o'clock in the morning, at Stamford-place, Lisson-grove. That was a stable, and four engines attended that fire. The Ordnance level was 115 feet; 160 feet of hose were used upon the occasion, and the height of the jet was 40 feet, and the fire was put out there with the pressure from the company's mains. Again, on the 24th September, at 13, Chapel-street, Edgware-road, at 10 o'clock, a fire occurred at a pawnbroker's, at which five engines attended. The pressure at the time was 82 feet; the Ordnance level was 102 feet. The length of hose was 160 feet, and we gave a 50-feet jet there, and the fire was put out by the company's pressure. Again in 1875, upon the 5th July, at 7.35 p.m., a fire occurred at Albert-yard, Stanhope-street, in the Euston-road, a stable. Four engines attended, and there two stand-pipes were used, and the pressure in feet was 84. The Ordnance level was 88 feet, the lengths of hose were 280 feet and 360 feet, and the height of jet was about 35 feet.

4506. What would that pressure of 84 feet be in pounds?—About 35 lbs. Again, on the 5th December 1875, a fire occurred in a shop in Church-street, Lisson-grove, and there four engines attended, and we had 80 feet of hose, and gave a jet 40 feet high; the pressure in feet at that spot was 76 feet. In 1876, on the 12th March, at ten minutes past six in the morning, at No. 243, Edgware-road, a stationer's shop caught fire; three engines attended; we used 120 feet of hose, and gave a jet of 20 feet, and the fire was put out by the company's pressure at that particular spot. Again, on the 22nd March, at nine a.m. a fire occurred at 1, Little Charles-street, Munster-square, at a private house; three engines attended, 120 feet of hose were used, and the height of the jet was about 40 feet, and upon that occasion the fire was put out with the company's pressure and that jet. Then again, in 1877, upon the 13th January, a fire occurred at a farm and cow sheds at Hampstead, at which four engines attended; the pressure upon the main was 105 feet, and the Ordnance level was 200 feet, and 200 feet of hose were used at that particular spot, and we gave 30 feet of jet. On the 22nd January, at 40, Carlton-hill, a private house took fire, at which three engines attended; there were 200 feet of hose used, and a 40-feet jet was given.

4507. All those are instances in which the fire was extinguished before the engines arrived by a length of hose applied to your stand-pipes?—Yes, that was so.

4508. And in those cases, I suppose, by the brigade?—The brigade attended with the hose and "dummy," that is to say, the stand-post; they applied them immediately, the water being there before they arrived, and in most cases the fire was put out before the engines worked at all.

4509. Do you mean that in those cases the turncock with the hose arrived first,

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first, and extinguished the fire before the engines came?—Yes, in some of those cases.

4510. In the first two you said the "dummy" was brought with the fire engines, I understood?—No, the fireman runs with the length of hose and the "dummy," if the water is there, and applies it immediately, without waiting for the fire engine, and in most of those cases it occurred that in that way the fire was put out without the aid of engines.

4511. I understand that was without the aid of engines, but I wish to know whether when the brigade arrived they applied the hose in lieu of the engines, or whether the turncock arrived first and used the hose?—The brigade arrived with the hose, and where water was ready they simply clapped the "dummy" into the plug-hole, and the water was applied to the fire.

4512. Showing that the brigade felt that they had full power with your pressure and a stand-pipe to do away with the use of engines at these particular spots?—At those particular spots.

4513. Can you give the Committee the number of miles of streets in which your constantly charged mains exist over your district?—In this company's district we have within the metropolis 70 miles of streets, in which there are 85 miles of mains constantly charged at pressures varying from 50 to 170 feet, or 22 lbs. to 74 lbs. by day, with an improved pressure in every instance by night.

4514. Going back to the fires which you have quoted, can you tell the Committee the length of time which elapsed between the first warning of fire and the application of the hose, with the view of showing that supposing the hose and these appliances had been fixed, so that they could be used by the police on duty, the fires would have been checked materially sooner than they were, even under the circumstances you have described?—No, we have no record of that.

4515. At the same time I suppose we may infer, the pressure being there and being available when it was used, that had these appliances been at hand for the policemen on duty to have applied them at once, the fires would probably have been put out much sooner?—There is no doubt about that.

4516. I think you were going on to say that there were 85 miles of constantly charged mains in the 70 miles of streets which there are in your district?—Yes.

4517. And with varying pressures of from 50 to 170 feet by day, and an improved pressure by night?—An improved pressure in every case by night.

4518. What is the pressure in the engine-house at Hammersmith?—The pressure in the engine-house at Hammersmith is 195 feet; that is reckoning from the floor, which is 6 feet 6 inches above Trinity datum.

4519. Sir Joseph Bazalgette in his evidence, I think, stated that the pressure in your district ranged from 20 lbs. to 30 lbs.; is that a correct statement?—No, it is not. We have a pressure varying from 50 to 170 feet, or from 22 lbs. to 74 lbs. I particularly wish to call the attention of the Committee to the Hammersmith district, where we have a very large pressure; the average pressure would be from 170 to 175 feet, and there Sir Joseph Bazalgette states that in one instance he has taken the pressure as only 12 lbs. upon the square inch, which would represent only 27 feet; that is impossible. I am not aware where those pressures are taken from, but in no part of the district, which is at an altitude of 20 feet above Ordnance datum, is there so low a pressure as 12 lbs., and there are several other instances of erroneous statement.

4520. Have you taken any pressure tests yourself over the district?—Yes, I have.

4521. With what results?—This is a list of the pressures in our district by day and also by night. (*The Witness handed in a Table.*)

4522. Now, with regard to the question of hydrants, what number of miles of main are there available in your district for the purposes of placing hydrants upon them?—There are 70 miles of streets in which hydrants could be placed, say at 100 yards apart.

4523. Those are all constantly charged mains?—Those are all constantly charged mains, and that would require 1,232 hydrants. My estimate for those hydrants is 12 *l.* 7 *s.* 6 *d.*

4524. What species of hydrants do you suggest?—The ordinary sluice valve, I think, is the most useful hydrant. I have had great experience with these valves.

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4525. That amount does not include any stand-pipe such as Captain Shaw suggested?—No, the hoses are screwed on to the branch off the valve.

4526. Have you placed any of these hydrants upon your district?—No, we have not.

4527. Are there no hydrants established?—There are no hydrants at present fixed in this company's district.

4528. Are there none in private establishments?—We have hydrants in one or two cases in private establishments.

4529. And you would represent that at an average expense of 12 *l.* 7 *s.* 6 *d.* you could place 1,232 hydrants at 100 yards apart on the mains in your company's district?—Yes.

4530. And would you get the pressure at all those points which you have described as being available at those fires which you have quoted?—We should. We should get a fair average pressure there quite useful for putting out ordinary fires.

4530.* With these sluice-valve hydrants, do you place them at the side of the road, or do you place them in the roadway over the pipes?—At the side of the road.

4531. So that your 12 *l.* 7 *s.* 6 *d.* includes the laying of the connecting pipe as well as the other charges for breaking the roadway and replacing it?—Yes, the 12 *l.* 7 *s.* 6 *d.* includes cutting a hole in the pipe, fixing the saddle-piece, opening the ground from the main across the road to the edge of the footpath, fixing the sluice-valve, and a cast-iron surface box, and the double branch outlets for the hoses to be fixed to.

4532. And looking at the differences in the pavements, and other things which you have to contend with, do you think, taking it on the average over the whole of your district, that sum represents the amount for which you could lay down your hydrants?—Yes, in gravel or granite roads, but not over wood pavement or asphalte.

4533. Then this is not the average over your whole district?—No; but there are very small portions of road paved with wood, except for experimental purposes, within this company's district.

4534. For that average of price you would get the sluice-valve hydrant you have described to the Committee placed generally upon your mains?—Yes.

4535. And you tell the Committee that the pressure in all those mains represents a pressure as you have described it to be in the particular instances you have quoted?—Yes.

4536. Now have you calculated at all the number of hydrants which you would require to cover the whole of your district, because, I suppose, there are portions of your district in which the mains do not run?—Yes; in the entire district of the company we should require 2,147 hydrants on the constantly charged mains; those, I take it, would average about the same cost, namely, 12 *l.* 7 *s.* 6 *d.* each.

4537. Have you got that amount of mains at present charged?—We have; the 2,147 hydrants would represent 122 miles of mains in the entire district.

4538. That is the connecting mains as well as the small mains?—Yes, it would represent the whole of the constantly charged mains throughout the company's district.

4539. Is the whole of your district under constant supply?—No, it is not; but these mains are all constantly charged from which the services draw for domestic use.

4540. At present have you any plugs directly upon these constantly charged mains?—There are here and there, say upon a 6-inch main, but not upon larger mains than that.

4541. Have you found any difficulty in keeping the plugs on those mains?—There would be a certain difficulty; in one case I know of a plug blown out, but as I say, it is not the rule to fix the fire-plugs upon the constantly charged mains but simply to fix them upon the services which are commanded by the street cock.

4542. With regard to the protection of your district from fire, how would you deal with that portion of your district where the service pipes alone run; you would not there be able to get that pressure which you have in your mains for the service of hydrants, would you?—We should to a certain extent; the services are generally not less than four inches, and these constantly charged mains run

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run through all the principal thoroughfares, the services are branched off from them, and upon them fire-plugs are fixed.

4543. But could you supplement your existing mains as they propose to do in the City, by mains connected with them, on which the hydrants in every instance would be fixed?—We could do so, as it would not be advisable to leave the valves open off the branch mains for the purpose of fixing those hydrants upon the services.

4544. You do not see how you could increase the existing length of mains for the purpose of hydrants?—Not under present circumstances; it would have to be a separate main laid down specially for the use of fire.

4545. And wherever you wanted to put down hydrants in addition to those which you have stated that you could apply to your present mains, you would have to lay down a fresh main for the purpose?—Yes, exactly.

4546. Has there been any deficiency in your district in the water supply at fires when the turncock has been called?—No, there has not been, except in very few instances indeed; the turncock has hardly ever been behind the engines, and when he has it has been generally in consequence of his not having been called till late, or not having been called at all. The turncocks generally arrive at a fire before the brigade and the fire engines.

4547. Have you any return made to you as to the time that the turncocks have arrived at fires in advance of the brigade?—Yes, I have. In 1874 there were 62 fires in the district of the West Middlesex Water Company where engines attended, and the turncocks arrived first 40 times before the engines; at the same time as the engines, 19 times; and, after the engines, three times; but in the last three cases the fires were trivial, and the engines were not worked at all. In 1875 there were 53 fires at which the engines attended, and the turncocks arrived first 33 times; at the same time as the engines, 18 times; and after the engines, twice; but in one of those two cases the fire was put out by the inmates before the engine arrived, and in the other case the turncock of the district was not called at all. In 1876 there were 47 fires at which the engines attended, and the turncocks arrived first at 32 of them; the turncocks arrived at the same time as the engines at 12, and after the engines, three times; but in two of those cases the fires were trivial and the engines did not work; in the other the turncock was not called until after the arrival of the engines.

4548. Have you had complaints made to your company, as we have had before in this Committee by the Metropolitan Board of Works, as to the non-attendance of the turncocks or the want of a supply of water?—Yes; we have. On the 23rd of December 1874, Mr. Wakefield, clerk to the Metropolitan Board of Works, wrote to the Secretary of the West Middlesex Waterworks Company.

4549. That was a circular which was sent round to all the companies?—Yes.

4550. Did you point out to the Metropolitan Board of Works the facts which you have just stated to the Committee?—Yes; I will read the letter; it is dated the 13th January 1875: "Sir,—Your letter of the 23rd ultimo with reference to the supply of water at fires having been laid before the directors, I am instructed to inform you that the company are desirous of co-operating with the Metropolitan Fire Brigade, so that as far as possible no delay shall take place in supplying water for the purpose of extinguishing fires. The company have already made several suggestions to the Metropolitan Board of Works and to Captain Shaw in order to effect this object, and they regret that none of them have been adopted; for instance—1st. They have proposed to instruct the men of the fire brigade in the use of the tools furnished to them, and in a knowledge of the position of the main and service cocks necessary to be opened whenever a fire occurs; this was declined by the late Mr. Braidwood, and not accepted by Captain Shaw when I wrote to him on the subject on the 22nd May 1867. 2nd. The company have provided fixed residences for their men, that there should be no alteration of station in the event of a change of turncock; and the directors offered to have the address of the nearest turncocks' stations painted on doors of fire-engine stations, of which no notice has been taken. 3rd. The company have repeatedly suggested that apartments should be provided at the fire brigade stations for a turncock, for which apartments the company offered to pay rent; this was not acceded to by the Metropolitan Board. (See their letter of date the 12th February 1868.) 4th. The company have also suggested that

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two lads should be kept at each fire-engine station, whose special duty it should be (one by night and one by day) to call the turncocks as soon as intelligence of a fire reaches the station. The company's engineer, superintendents, and inspectors will be happy to place themselves in communication with the officers of the fire brigade, and afford them every information and facility for obtaining water at all times; and I hope it will be felt that the company's existing arrangements have been hitherto very satisfactory, as I find from the record of the fires kept in this office, that, when engines attended, 62 fires (exclusive of chimneys) have happened in this company's district, within the metropolitan area, during the year 1874; out of which the turncocks arrived before the fire engines, 40 times; at the same time as the engines, 19 times; and after the engines, 3 times; but in these three last cases the engines were not worked. The company pay rewards both to the first and second persons who call the turncocks, and have also lately increased the pay of their turncocks for attending to this special duty. The directors feel there would be great difficulty in complying with the suggestion of the Metropolitan Board in turning on the water at certain fixed hours of the day otherwise than is done at present; and it would not be of much use to furnish a list of the streets, &c., with the time the water is now turned on, as alterations are necessitated in summer and winter, and occasionally from other circumstances. The firemen can always ascertain whether the water is or is not on in a street by starting a plug; and I am desired to add that in this company's district there are about 67 miles of streets and roads, wherein the mains are constantly charged. I am also directed to call your attention to a letter which I wrote to the late Sir William Tite, an influential member of the Metropolitan Board of Works, on the 10th May 1867, at the time a Committee of the House of Commons were considering a "fire protection" Bill; which letter, if you have it not, and the Board would like to have a copy, the directors will be glad to furnish it. I am, Sir, &c., *W. H. Whiffin*, Secretary."

4551. And since then, as I understand, the company have gone to the expense at the Hammersmith station of providing appliances for summoning the turncocks from the brigade station?—We have. We have made a communication across the road and connected the brigade fire-bell with the turncock's station fire-bell.

4552. I believe your company pay very largely in rewards for calls to fire to the turncocks?—Yes, we do; and the company pay rewards to any persons who call turncocks to a fire at the rate of 2 *s.* 6 *d.* to the first person, and 1 *s.* to the second person, and 1 *s.* in the case of chimneys being on fire.

4553. That proves that the company do as much as they possibly can in order to increase the probability of the turncock being present when the brigade arrive?—Quite so.

4554. In your answer to the Metropolitan Board of Works, besides making those suggestions, you point out that the number of times in the year 1874 in which fires have occurred in your district show that in only two instances had the turncock been behind-hand in his attendance, with the reasons for his non-attendance on those occasions?—Quite so.

4555. To this letter, in which the company pointed out all these suggestions to the Metropolitan Board of Works, they have had no answer?—They have had no answer to it.

4556. Now I believe the company provide stations for all their turncocks, so as to enable the brigade to be quite certain where the turncock resides, even though there are changes of men?—Yes, we do.

4557. Do you place them as near the brigade stations as you can?—Yes, we do as near as we possibly can; we have 22 permanent stations which are very near the brigade stations, and eight temporary stations.

4558. How many turncocks do your company employ?—We have 31 turncocks, and 10 deputy turncocks, who are not allowed to leave their stations without making arrangements to ensure attendance in case of a call to a fire.

4559. You quoted the number of times in which the turncock had attended in three years before the brigade arrived, to show that they do their work properly?—Quite so.

4560. Now with regard to a question which has been asked most of the witnesses, as to the supply of Captain Shaw's requirement of 2,000 gallons per minute for the 14 plugs; how would that affect your district?—I think that in most districts it could be met.

4561. Over

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4561. Over the whole of your district, supposing hydrants were placed on the mains as you have suggested?—Yes; 2,000 gallons per minute would represent a very large quantity for a very large fire, and it would be required from 14 plugs. I can quote an instance of a fire which occurred at Hammersmith, where five steam fire engines were actually working from one plug, and in that case a large quantity of water was going down the gutters; in fact, we had to regulate the sluice valve to prevent the water from flooding a portion of our own works.

4562. That was in your Hammersmith district?—That was in the Hammersmith district.

4563. What amount of feet pressure have you in that reservoir?—We have in that reservoir 190 feet pressure.

4564. It was with that pressure from that reservoir that what you have described took place?—Yes, the pressure was maintained by the pumping of engines in this particular case.

4565. So that it does not represent the ordinary pressure from your reservoir?—No; we were at the time pumping up to the head of the Barrow-hill Reservoir, but the pressure was maintained by the pumping of engines.

4566. And five steamers were enabled to work from one plug upon that occasion?—Yes, and after the fire was partly subdued the brigade put in a stand-pipe with two outlets and played upon this fire, simply using the company's pressure; this was through a length of hose of about 280 feet.

4567. Now, you have stated several instances to the Committee in which you have shown your pressure gives a considerable jet of water with a very great length of hose; have you made any experiments as to the loss of pressure in using various lengths of hose pipes?—I have; experiments were made under a pressure of 175 feet in the main through 2½-inch hose in different lengths from 40 feet to 320 feet.

4568. In what part of your district was this?—This was tried at the pumping-station at the Hammersmith Works off a 12-inch main.

4569. What was the size of the hose?—Two and a half inches, the ordinary brigade size, with a ½-inch nozzle and 175 feet pressure in the main with a 40-feet length of hose; the pressure at the nozzle in feet was 172. I may explain that the branch pipe at the end of the hose had a pressure gauge fixed upon it corresponding with the pressure gauge fixed on the main, so that we were able to arrive at the exact loss of pressure in passing the water through the different lengths of hose, and the height of the jet was 80 feet, delivering 50 gallons a minute; and those experiments were carried on with 80, 120, and up to 320 feet of hose; and from the 320 feet length, with a ½-inch nozzle, the pressure at the nozzle in feet was 163 feet.

4570. The pressure at the valve being 175 feet?—One hundred and seventy-five feet; that was a loss of pressure equal to 12 feet only; it gave a jet of 75 feet high, delivering 49 gallons a minute.

4571. Did you try them with any other sized nozzle?—I did, with a five-eighths inch nozzle and a 40-feet length of hose; the pressure at the nozzle was 168 feet; we obtained a jet 90 feet high delivering 76 gallons a minute, and we continued those experiments on with the 320 feet length of hose, the pressure at the nozzle was 143 feet.

4572. It had sunk from 175 feet to 143?—Yes, a loss of 32 feet; we had a jet of 80 feet delivering 70 gallons a minute. With a three-quarter inch nozzle and 40 feet length of hose, the pressure at the nozzle was 162 feet, giving a height of jet of 100 feet delivering 108 gallons a minute; those experiments were continued on to 320 feet of hose, equal to eight lengths of 40 feet; the pressure at the nozzle was 130 feet, and the height of the jet 85 feet, delivering 93 gallons a minute. With a seven-eighths inch nozzle the pressure with one length was 148 feet, height of jet 100 feet, delivering 140 gallons a minute. Those experiments were continued on to the 320 feet length, through which we obtained a pressure at the nozzle of 103 feet, giving a loss of pressure of 72 feet, and the height of the jet was 75 feet, delivering 115 gallons a minute. With an inch nozzle the pressure at the nozzle in feet was 134 with one 40-feet length of hose; the height of the jet was 100 feet, delivering 187 gallons a minute. Those experiments were continued up to 320 feet length of hose, and we obtained with an inch nozzle 73 feet pressure at the nozzle, with 65 feet of jet, delivering 130 gallons a minute. Those were all experiments made with 175 feet of pressure.

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4573. Did you try any other pressure?—Yes, I tried further experiments with a pressure on the main of 75 feet only, and a length of hose of 320 feet with a half-inch nozzle; the pressure at the nozzle in feet was 71; it gave a height of jet of 50 feet, delivering 33 gallons a minute. With five-eighths of an inch nozzle the pressure at the nozzle was 65 feet, giving a height of jet of 43 feet, delivering 48 gallons a minute. With a three-quarter nozzle the pressure upon the nozzle was 55 feet, giving a height of jet of 37 feet, delivering 63 gallons a minute. With a seven-eighths of an inch nozzle the pressure on the nozzle was 43 feet, and the height of the jet 30 feet, with a delivery of 78 gallons a minute. With an inch nozzle the pressure at the nozzle was 28 feet, and the height of the jet was 25 feet, delivering 81 gallons a minute. Those are the results of the experiments which I made with a two and a half inch hose.

4574. Those were made recently?—Those were made recently.

4575. Mr. *Hayter.*] Were those hose fitted on to a hydrant?—They were.

4576. *Chairman.*] Did you continue them for a time to see whether the pressure remained constant?—Each experiment was continued for about a quarter of an hour.

4577. Sufficient to satisfy you that it was a constant pressure?—Quite so. I may say that the water was delivered into a cistern at ground line, to ascertain the quantity, but the jet was quite vertical in all cases.

4578. I understand your mains are all connected together, so that if hydrants were fixed upon them the full volume of water would be available from the various mains?—That is so; they are used in every way one with another.

4579. Do you agree with the witness who states that fire-plugs on intermittent services are not subjected to the great pressure that was said to be brought upon them?—I do entirely.

4580. Upon the same ground, namely, that the cisterns being filled first, taking off the first pressure, the pressure comes gradually upon them?—Quite so.

4581. You state that you have 70 miles of streets, with 85 miles of mains; is it true that, as has been stated, as many as six lines of mains run in the same street?—Not in this company's district; there may be two or three, but in a very small portion of the company's district.

4582. So that your mains are fairly distributed over the whole of your district, and if these hydrants were placed upon them they would be available generally for the whole of the district?—Yes, they would.

4583. Are your company's mains connected with any other company's?—We have connection with the New River Company's mains, and also the Grand Junction Company's mains; with the New River Company's mains at Tottenham Court-road, Oxford-street end, and also the Euston-road end; and with the Grand Junction Company's mains at Tyburn, in Oxford-street.

4584. Is there anything else you wish to place before the Committee?—I do not think there is any other point.

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Thursday, 10*th May* 1877.

MEMBERS PRESENT:

Mr. Clifton.	Mr. Locke.
Mr. Forsyth.	Sir Andrew Lusk.
Mr. Hardcastle.	Mr. M'Lagan.
Mr. John Stewart Hardy.	Mr. Onslow.
Mr. Hayter.	Sir Henry Peek.
Sir James M'Garel-Hogg.	Mr. Ritchie.
Mr. Kinnaird.	Sir Henry Selwin Ibbetson.

SIR HENRY SELWIN IBBETSON, BART, IN THE CHAIR.

Mr. *Thomas Hack*, re-called; and further Examined.

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4585. *Chairman.*] I WISH to re-open my examination of you on one point only. On looking through the evidence, I see in answer to Question 4523, you state, "Those are all constantly charged mains, and that would require 1,232 hydrants"; and then at No. 4536 in answer to the question, "Now have you calculated at all the number of hydrants which you would require to cover the whole of your district, because, I suppose there are portions of your district in which the mains do not run." You say, "Yes; in the entire district of the company we should require 2,147 hydrants on the constantly charged mains." Those two figures do not seem to agree at all, and I wish to ask you if you can explain to the Committee how it is that in the first you say there are 70 miles of streets, in which 1,232 hydrants would require to be fixed, but that your constantly charged mains would require 2,147 hydrants?—There are 122 miles of mains in the entire district, including that outside the metropolitan area as well as that inside.

4586. What we are enquiring into, rather relates, therefore, to the 70 miles of mains than to the 122?—Quite so.

4587. Mr. *Onslow.*] May I ask you how you ascertained the heights of the jets you referred to?—I had the side of the engine-house marked every five feet, and the height was about 55 feet, and I had a man on the top of the engine-house with 20 and 10 feet staves, those he hoisted up one above the other, so as to get the height, and we also had the works chimney, which is 1 20feet high, to act as a gauge as well, and we checked by that; so I think the heights which I have given are as near as we could possibly arrive at them.

4588. Will you refer to Question No. 4577; you say "The water was delivered into a cistern at ground line;" will you explain what you mean by that jet being, as you say, vertical?—I say "Quite so; I may say that the water was delivered into a cistern at ground line." I should have added, "to ascertain the quantity."

4589. Still the jet was quite vertical?—Yes; we tried first of all into the cistern at the ground line to ascertain the quantity, and then the branch of the hose pipe was pointed perpendicularly, and the jet was quite vertical.

4590. Will you kindly state from the Act of Parliament what is your pressure?—The company's obligation with regard to pressure is that we have to supply water at such pressure as to make the water reach the top storey of the highest houses within the water limits, but we are not required to supply the water at any higher level than 200 feet above Trinity high-water mark at Hammersmith Bridge.

4591. Is your company dependent for a supply of water upon the reservoirs mentioned in your evidence, given upon the last occasion at page 336; if not,

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where else is there any supply?—The larger portion of the company's district is supplied by pumping engines, and a portion of it is supplied by gravitation from those reservoirs, and the water that is taken out of those reservoirs during the daytime is made good during the night by pumping; so that the engines are always kept pumping at the Hammersmith Works to keep up the reservoir, and also for keeping up a high pressure in the district by night and by day.

4592. So that you are wholly dependent upon the reservoirs?—We are wholly dependent upon the reservoirs maintained by the pumping power.

4593. What is the character and extent of the fires you referred to in your evidence at No. 4497; were they large fire or small?—I can give the particulars of those fires if required; they were not very large fires; some of them were small fires, and some of them were of moderate extent.

4594. What is the greatest number of engines which were employed at the largest fires?—I think in one case there were as many as five fire-engines.

4595. Not more than five?—No, not more than five.

4596. What was the least number?—The least number, I should say, was only one engine.

4597. Do you say the company has provided a constant supply, and has given notice to the Metropolitan Board of Works to lay down hydrants?—No, we have not.

4598. Sir *Henry Peek.*] I asked you to be so good as to consider Mr. Bramwell's answer to Question No. 5865, "Do you mean to deliver at the level or at a height?" because he specially mentioned your company, and to my mind it would appear that the statutory pressure does not exist throughout your district?—I have just stated what the company's obligations are, namely, that we are simply under obligation to supply water at such pressure as shall make it reach the top storeys of the highest houses within the water limits.

4599. But that cannot be in this case; Mr. Bramwell says, "I will assume that in the case of the West Middlesex Water Company, their obligation to give 200 feet pressure above Trinity high-water mark at Hammersmith Bridge means not only Hammersmith Bridge, but means at a level equal to that throughout their district. I do not think it does, but I assume it. I now assume that we are in a street 50 feet above Trinity high-water mark; 50 feet has gone at once from the 200, leaving 150; we want 50 feet of jet; that requires 80 feet of pressure at the nozzle; 80 feet from the 150 leaves 70; we want 200 feet of hose, and that 200 feet of hose will take off another 50; that leaves 20, and that 20 would represent the only force available to drive the water through the iron pipes to the hydrant, but 20 feet would be a very poor head to do that. If the place were situated at any considerable distance from the waterworks, 20 feet of head would be absorbed in one-seventh of a mile of 4-inch pipe"; the meaning of all which, to my mind is, that at the end of that, you might get the water at the surface, but would get nothing more?—That is so. You would get the water at the surface, and you would get a small amount of jet, but you would not get, with that length of hose, and with a 1-inch nozzle, a large jet.

4600. Then do you think that under those circumstances the company *bonâ fide* (not using the term offensively in any way) carry out the Act of Parliament?—I think we do in every instance.

4601. Mr. *Stewart Hardy.*] I think it was Sir Joseph Bazalgette who put it to this Committee, that 150 gallons a minute through 200 feet of 2½-inch hose would entirely destroy the pressure, and that the delivery would be only at the surface, and that you would have no jet. Now is it usual ever to attempt to get a jet through 2½-inch hose without applying a nozzle to it?—Certainly not.

4602. Is it not the fact that if an ordinary fire-brigade nozzle were applied to that 200 feet of hose, with 50 feet pressure, you would get 70 gallons a minute to a height of 35 feet at the other end of it?—That is so.

4603. So that as he put it, there is a destruction of pressure, whereas, under ordinary conditions there would not be that destruction of pressure, but you would get a jet of 35 feet?—You would have a destruction of pressure to a certain extent.

4604. But it was represented to us as an entire destruction of pressure, whereas you would get a jet of 35 feet?—You will get that jet. The water would

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would not merely flow out of the nozzle; you would get a certain jet in most cases. I do not know to what extent. Mr. *T. Hack.* 10 May 1877.

4605. It was represented to the Committee that the flow at the end of that 2-inch hose would simply be a flow on the ground, but as a matter of fact you would apply a nozzle, and by applying a small nozzle you would get the jet?—Yes.

Mr. *Charles Few*, called in; and Examined.

4606. *Chairman.*] I BELIEVE you are the Solicitor to the Chelsea Water-works Company?—I am. Mr. *C. Few.*

4607. And I understand that you have been requested to give evidence before this Committee with regard to certain points which have been put in evidence by other companies, namely, the Lambeth, Grand Junction, and the Southwark and Vauxhall Water Companies?—I have been asked to put in certain statistical information on behalf of those companies. The companies are prepared to give any detailed information by their engineers which may be wished by this Committee: but it was thought by the companies, on whose behalf I appear, that those various matters had been sufficiently gone into in detail, and that if we gave certain information in the form of statistics, which we wish to put on record in the Minutes of this Committee, it would perhaps be sufficient for all the purposes for which this Committee has assembled.

4608. I suppose the information you would wish to put in is the relative pressures of the different companies, the miles of constantly charged mains which they have in those companies, and the facilities which they have given for better security against fire?—Yes.

4609. So as to have a record before this Committee of what all the companies have done on all these principal points?—Quite so. (*The Tables were handed in.*)

4610. Will you state shortly the principal points brought out by those returns?—If you will allow me I will take the first, namely the Chelsea Water-works Company. If the Committee will be good enough to refer to this return they will see that the company have given the area of their water supply within the metropolitan district as five square miles; it contains 170 miles length of mains in such area, and the length of mains in that area under constant pressure is 56 miles. That will be understood better by this map, which I beg to hand in, upon which the Committee will see red lines indicating the mains; that represents 57 miles under constant pressure upon which hydrants could be fixed to-morrow.

4611. Are those mains kept constantly charged?—Yes, those mains are kept constantly charged night and day with the pressure from the top of Putney Heath.

4612. On those mains, I suppose, there are neither hydrants nor plugs at present fixed?—No, I believe the plugs would be on the service mains.

4613. Can you give the height at which your company can deliver water above the pavement?—That height is given between six in the morning and six in the evening; the minimum being 40 feet, and the maximum 120; and from six in the evening until six in the morning, the minimum is 120 and the maximum 140 feet; the number of houses supplied in the district is 28,737, and the number of fire-plugs, 4,000.

4614. Are you able to tell the Committee how that supply of water is maintained; is it by pumping or by gravitation?—By gravitation entirely; by pumping originally from Kingston up to Putney Heath, from there it is entirely by gravitation.

4615. The whole of the supply in the constantly charged mains, is by gravitation from the reservoirs?—It is.

4616. Are there many hydrants in your district?—There are many hydrants for private use in private premises, but there are none for public service.

4617. What number of reservoirs have you in your district?—There are three reservoirs situated on Putney Heath, and they are 185 feet above Ordnance datum; they are all in the same place.

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4618. Can you tell the Committee what is your statutory obligation with regard to delivery in the Chelsea district?—Only such as is supplied from the reservoir on Putney Heath.

4619. There is no height specified?—No.

4620. Can you state whether there is any great variation in the heights of your district, or is it a tolerably level district; that is to say, whether the 185 feet is very considerably diminished in many parts of your district by the heights of the houses which take the supply?—I should suppose that it is fairly uniform.

4621. And that, therefore, you get the gravitation pressure, or very nearly the gravitation pressure, of your 185 feet?—I cannot speak to that.

4622. There is one point upon which, I think, we require a little explanation, if you are able to give it to the Committee, and that is this: I understand you to say that the supply in your mains is by gravitation; under those circumstances, can you give the reason which accounts for the difference in the height of the delivery of water as between the night and the morning?—I apprehend that it is that the pressure is reduced by the district being supplied. During the morning and afternoon all the district has to be supplied.

4623. Whilst the drain upon the service-pipes continues, the pressure in your mains is reduced from the 120 which is maintained at night to 40 at some periods of the day?—Yes.

4624. What are the capacities of those reservoirs?—The reservoirs together contain 11,000,000 gallons; but as regards those reservoirs I may say that when the large fire at the Pantechnicon took place, 8,000,000 gallons were supplied by the company between Saturday, Sunday, and Monday, which supplied water for 15 steam engines which were at work at the same time.

4625. And you represent that practically your pumping power is sufficient to keep up a supply in your reservoirs, so that you have a constant power of 11,000,000 gallons for any emergency?—Yes, I believe so.

4626. Have you any return of the fires which have occurred in your company's district during the last three years?—This Table includes a return of the fires which occurred during the three years ending Lady Day last. The fire-calls altogether during that period were 243; with respect to the water being at hand before the arrival of the first engine, that occurred on 63 occasions.

4627. That was where the turncock arrived first?—Yes; the engines arrived before the water on 26 occasions, and in the columns I have given the times as divided between 5, 10, 15, and 25 minutes. The water was at hand five minutes before the first engine arrived on 41 occasions out of the 63 times which I have just stated, and so on.

4628. Those figures in the first column represent the number of minutes by which the turncock preceded the engine at a fire?—Yes, or the converse. Then beneath is the return of fires extinguished without an engine being used; that was on 205 occasions out of 243, so that what were called fires were very small as regards the 205.

4629. In those 243 do you include what are called chimney fires?—I do.

4630. That would account for the large number of 205 which were put out without the engines being brought into play?—Yes.

4631. Were any of those 205 cases of fires of any considerable magnitude?—No; I should apprehend not.

4632. In asking that question I wished to know whether you could tell the Committee, as the last witness did, of any cases in which fires were extinguished by the use of hose applied to your plugs whilst the engines were there, but without the engines being used?—I am not in a position to answer any detail of that sort, but the engineer or superintendent could be put into the box to answer any details that were required.

4633. I believe you, like other companies, follow out the principle of paying considerable sums in the course of the year to people for calling your turncocks?—Yes; during the three years ending Lady Day last we paid rewards amounting to 37 *l.* 17 *s.* 6 *d.*

4634. That is for three years?—Yes; giving an average of 12 *l.* a year.

4635. That relates to the Chelsea Waterworks Company. Now will you give us the same facts as regards the Lambeth Water Company?—The area of the water

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water supply of the Lambeth Water Company in the metropolitan district is 23 square miles; the length of mains in that area is about 100 miles, and the total length of mains in the area under constant pressure upon which hydrants could be attached is about 65 miles. I beg to submit a map showing the Lambeth area with the mains marked upon it (*producing the same*).

4636. With regard to that map can you say whether, as in Chelsea, those mains are distributed fairly throughout the area?—Yes, they are distributed fairly throughout the area, having regard to the population; a good deal of the Lambeth district is in the country, which is not the case with the Chelsea district. Chelsea is pretty thickly studded with houses throughout its area.

4637. Otherwise the constantly charged mains are pretty fairly spread over the district in proportion to its population?—I believe so.

4638. Are there large areas in the more populous parts in which mains constantly charged do not run?—That is so in some places.

4639. Now can you give the height at which the company deliver water above the pavement?—The height at which the company deliver water above the pavement as between 6 a.m. and 6 p.m., is a minimum of 30 feet and a maximum of 80 feet.

4640. Can you say what their statutory obligation is?—Their obligation under the Act of 1848 was only to supply water under pressure equal to the height of the water in their own reservoir, whence the supply was given, and not in any case to an elevation exceeding 150 feet above Trinity high-water mark of the River Thames.

4641. There was great latitude in the conditions of that company?—Yes.

4642. And, as I understand, the height of their delivery as between 6 a.m. and 6 p.m., is a minimum of 30 feet and a maximum of 80?—Yes.

4643. Then as regards night, what is it?—As regards night, there is a minimum of 50 feet, and a maximum of 120. The number of houses supplied in the district is 42,000, and the number of fire-plugs in the district is about 8,000.

4644. Have they any hydrants either for public or private use?—They have many hydrants for private use, but none for public service; they have eight reservoirs used for service within the metropolitan district, two at Brixton-hill.

4645. What are their heights?—One hundred and fifteen feet each; there are two at Streatham of 197 feet each; two at Rock-hill, Sydenham, one of 372 feet, and the other of 387 feet; one at Norwood, which has a height of 315 feet, and one at Selhurst, which has a height of 218 feet.

4646. The lowest height there of a reservoir above Ordnance datum is 115 feet?—That is the Brixton-hill one. Then, as regards the contents of those reservoirs, the Brixton reservoirs contain 12,000,000 gallons; the Streatham reservoirs contain 7,500,000 gallons; the Rock-hill reservoirs, 615,000 gallons; the Norwood 5,000,000 gallons, and the Selhurst reservoir, 2,500,000 gallons, making a total of 27,615,000 gallons. There were 220 fires in the company's district during the three years ending the 31st March last.

4647. Are you able to say whether that number includes chimney fires, as the other return did, or not?—Yes, that number includes all the fires. Of those 220 fires, 187 were got under without engines being used, and engines were only used on 33 occasions.

4648. Can you state the number of chimney fires as separate from the number of fires in the district?—I am not able to say that.

4649. There is another question which I wished to ask with regard to the Lambeth Company, and that is, how this pressure is maintained; is it by pumping or by gravitation?—It is partly from the reservoirs and partly from pumping. When the engines are supplying the pressure, there is generally better pressure than from the reservoirs; the pressures stated in the table are from the reservoirs.

4650. The next company which you wish to refer to is, I believe, the Grand Junction Company?—Yes; the area of the Grand Junction Waterworks Company's supply within the metropolitan district is six square miles; the total length of mains in that area is 200 miles, and the length of mains in that area, under constant pressure, night and day, is 41½ miles. I beg to submit a plan

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with the Grand Junction Company's area coloured in pink, with the mains constantly supplied shown in blue (*producing the same*).

4651. There are two large areas in the district in which I see there are no constantly charged mains at all?—That is because of their being only land.; one is Kensington Gardens and the other is Wormwood Scrubs.

4652. Will you state first whether any conditions are laid down in the Act under which they were created with regard to the height at which water was to be delivered?—Their obligation is to supply water to 150 feet above Trinity high-water mark.

4653. Is that the height to which the company is bound to deliver under their Act?—Yes, under the Act of 1852.

4654. Can you give the heights now as between six in the morning and six in the evening at which the company deliver water above the pavement?—As regards the height above the pavement from 6 a.m. to 6 p.m., the pressure varies from a minimum of 40 feet to a maximum of 80, and from 6 p.m. to 6 a.m. from a minimum of 30, to a maximum of 60.

4655. Have you any information which would explain to the Committee why the falling off here takes place at night?—A portion of the supply is given by pumping which ceases during part of the night, and therefore the pressure is less at night than it is relatively in the day.

4656. And therefore over that district the supply for the purposes of fire at the time when fires generally occur is at its minimum?—It is somewhat less. The number of houses supplied in the district is 29,123, and the number of fire-plugs is about 3,800.

4657. Then with regard to hydrants?—There are numerous hydrants in use for private purposes. As regards public service there are no hydrants especially for fire purposes; the company have 63 standposts for street watering purposes, which are available for fire purposes only during the road watering season, and 43 other standposts for street watering purposes, capable of being used all the year round for fire purposes, and the whole of the 106 standposts are supplied from mains constantly charged, and I should say that, as regards the other two companies I have spoken of, they also have standposts for street watering purposes, but they have made no special report in respect of their adaptability for fire purposes.

4658. Wherever they have such, they are available for fire?—Except where they are made to suit the demand of the parish; if they have standposts upon which pipes can be screwed they would, of course, be available for fire.

4659. Can you state the number of reservoirs in the Grand Junction district?—The number of reservoirs are three, on Campden-hill, Kensington, in addition to the company's pumping-station, which is at Kew Bridge, with which these reservoirs are in communication.

4660. I understood you just now to state that in one part of the district the supply was actually from pumping, and not from the reservoirs?—It is; it goes direct from the engine and passes to the reservoirs.

4661. Where are the reservoirs?—They are all three on Campden-hill.

4662. And all the same height?—Yes; the height is 136 feet, which is applicable to the three reservoirs.

4663. What is their capacity?—Their capacity together is 18,000,000 gallons. With respect to the number of fires which occurred up to Lady-day last, there were 250 calls; the water was supplied before the first engine came on 229 occasions, and the engine arrived before the supply of water was available on 21 occasions; that is besides trifling alarms of fires with reference to chimneys, which were 49 in those three years.

4664. Does that mean that in the Grand Junction Company's district the 229 occasions where the water was before the engines were not chimney fires?—They were not chimney fires; the chimney fires in this return are kept distinct.

4665. Now fire is got under, I see, without the use of engines on many occasions?—There were 250 fire-calls, and the engines were only used on 41 occasions. As regards the other 209, the fire was got under without the engines being used at all.

4666. You cannot give any facts with regard to this point with reference to whether those 209 occasions were occasions in which the hose was applied to a plug

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plug or a hydrant?—There are no returns which will enable me to answer that.

4667. And I see a small sum of money was given in these three years for calls?—Yes; that applies to all the companies; all the companies give rewards.

4668. I suppose this fire-call does not include false alarms?—I understand not.

4669. Let us go now to the Southwark and Vauxhall Water Company?—The Southwark and Vauxhall Company have 20 square miles of area of water supply within the metropolitan district; their total length of mains is 500 miles; the length of mains in that area under constant pressure is 112½ miles. I beg also to submit a plan of the district in this case, showing the mains constantly charged, the green showing the district of the company which is out of the town at Roehampton and that district. On the Surrey side of the Thames they supply Battersea Park, Clapham Common, Wandsworth Common, and Roehampton.

4670. With regard to the mains, they appear to be principally leading mains, which are constantly charged, and not mains distributed much through the streets?—They are not distributed much through the side streets.

4671. Now with regard to that company, have they any conditions laid down in their Act with reference to the height of water delivery?—Under the Company's Act of 1852 the maximum height at which they are required to have water laid on is 150 feet above high-water mark at Vauxhall Bridge according to the Trinity standard.

4672. What is their delivery above the pavement in each case between 6 a.m. and 6 p.m.?—That ranges between 50 feet and 70 feet, and their delivery between 6 p.m. and 6 a.m. ranges between a minimum of 70 feet and a maximum of 150 feet.

4673. Is this water supplied by gravitation or by pumping?—It is all by pumping.

4674. I suppose the reason of the larger pressure at night is that it is less drained whilst the pumping continues the same throughout?—There is sufficient pumping to give an additional height.

4675. What number of houses are within the area which this company supply?—The number of houses supplied by the Southwark and Vauxhall Water Company within the metropolitan district is 60,000; the total number supplied being 77,880. The number of fire plugs is 33,000, and I would say as regards the question of the water being supplied by engine power, that the company have a reservoir under construction, which will give them 200 feet pressure above Ordnance datum.

4676. Instead of 150 feet?—Yes, instead of 150 feet.

4677. In this company's district they have also a good many private hydrants, but no public ones for fire purposes?—They have none specially for fire purposes, excepting those for street watering, upon which I have observed as regards a prior company.

4678. Then with regard to the reservoirs?—They have six reservoirs in use and there are four in course of construction; the six in use are a little above Ordnance datum, but the four which are under construction, will be about 200 feet above Ordnance datum.

4679. I suppose from those reservoirs which are under construction, you will get a gravitation pressure?—Yes; as regards the capacity of the reservoirs in use at present, it is 66,000,000 gallons, and the four under construction will give an additional capacity of 20,000,000 gallons.

4680. Can you say whether in this company there is any connection between the reservoirs, so as to afford the power of bringing the whole of the contents of all the reservoirs to bear?—I am afraid I am not in a position to answer that question.

4681. In this instance your returns for fires which have occurred in the district, are for two years and eight months?—The returns are for two years and eight months; there were 265 fire-calls during that period, and the water arrived before the first engine on 263 occasions out of the 265, and the engine before the water only on two occasions.

4682. That does not include chimney fires, does it?—In addition to that 265, there

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there were 51 trifling alarms of fires, which represent the chimney fires. The number of fires which were got under without the necessity of using engines was 188, out of the 265, the engines being used on 77 occasions.

4683. Mr. *Stewart Hardy.*] Does that mean that they are put out by the fire brigade or by private individuals; did the fire brigade put them out with buckets, or did the private individuals put them out with buckets?—Either one or the other. As far as I am in a position to say, it merely shows that the engines were not used on those occasions at all.

4684. *Chairman.*] It does not show any neglect or delay on the part of the fire brigade, but it simply implies that the fire was probably a small fire, and put out by the fire-brigade men when they first arrived, or by the people about the place with a bucket?—Yes.

4685. I see there also that the company paid rewards?—The company also paid for alarms of fire.

4686. The summary of that amounts to this, that there are 275 miles of mains in the area of the four companies at present constantly charged?—Yes.

4687. Upon which the companies represent that hydrants might be placed?—Yes.

4688. And if there placed, that pressure which you give renders them serviceable?—Yes, throughout the four districts.

4689. Is there anything else which you wish to represent to the Committee?—No, I do not think there is.

4690. Sir *Henry Peek.*] Do I understand you, as representing these four companies, that they all carry out their Parliamentary requirements as regards force of water?—Speaking generally, I believe they do.

4691. Mr. *Hardcastle.*] You stated that the company got their water by pumping; where do they pump it from; out of the Thames?—No; they have reservoirs of properly filtered water, but the reservoirs are low, being towards Battersea Fields, and they have to pump it up to get a height sufficient to serve the district.

4692. Where are those reservoirs supplied from?—The water is pumped originally from Hampton out of the Thames. It is filtered, and pumped up all the way to Battersea Fields.

4693. Are all those four companies supplied by the water of the Thames alone?—Yes; they all take their water supply from the Thames above Hampton; the only companies which do not take water from the Thames are the New River and the Kent Water Companies.

4694. Mr. *Stewart Hardy.*] The East London Company takes a considerable portion of its supply also from the Thames, does it not?—It does from Sunbury.

4695. *Chairman.*] Can you say from your own knowledge whether your own company or the other companies, about which you have been giving evidence, have made representations to the Metropolitan Board of Works at any time with regard to the fact that they have constantly charged mains upon which hydrants might be placed, calling the Board's attention to the Act of Parliament which suggested the application of hydrants?—I believe the fact has been made known to the Metropolitan Board of Works.

4696. But you are not able to speak distinctly about that?—I am not.

Mr. *William Hamlyn*, re-called; and further Examined.

Mr. *W. Hamlyn.*

4697. *Chairman.*] The Committee wish you distinctly to understand that you should confine yourself to putting before them any points in which you think the fire brigade has been misrepresented, or is likely to be injuriously affected by the evidence given by Mr. Swanton of which you complain, as the Committee are satisfied with the evidence given as regards the working of the brigade and its history; will you state to the Committee what those points are to which you desire

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desire to refer?—I would beg to refer the Committee first to Question 6991 in the evidence of last year.

4698. The answer to that was: "I have seen before now as many as perhaps a dozen policemen clearing away a very small crowd, while only three or four firemen were hard at work; now, if three or four of those dozen policemen could help the firemen, as a sort of auxiliary to the fire brigade, I think that fires might be extinguished very much more quickly, and the firemen's labour very much lessened;" what do you wish to say upon that?—What I mean to say about that is that the reverse of it very often happens, more particularly at large fires, when the action of the firemen has been impeded from the want of police to keep the crowd back.

4699. You would represent to the Committee that it would not be possible, in your opinion, to take the police off from the graver duty of keeping back the crowd, and therefore allowing you to do your work, by making them supplement the firemen?—In very many fires that would happen so; in large fires, more especially. The next point that I have to refer to is Question 6995.

4700. The answer there was with regard to two cases which the witness stated he remembered at the moment; "One at Rushey Green, where a fire-engine is placed close to the police-station, and again at Shooter's Hill"?—I would say that the police-station is a mile from the fire-engine station at Rushey Green.

4701. What you mean to say is, that it was not fair to represent that they were close together?—Yes, in reference to Rushey Green. The next point arises upon Question No. 7006.

4702. That is with regard to the number of the engines, the question being, "The number of them being altogether 98?" which he stated referred "to effective stations;" there were a very great many more which we could not depend upon, but 98 stations might be relied upon as giving proper help when a fire occurred?—I say nothing like that number existed during my time, namely, 25 years; it must have included many engines which existed in the City, which were, to a certain extent, useless, or imperfectly kept up.

4703. You represent that there were not that number?—There were not that number in 1865.

4704. You next wish to refer, I believe, to Question 7008, but it will be hardly necessary for the Committee to go into a comparison between the time of Mr. Braidwood and the present time; the Committee are perfectly satisfied with the evidence which has been given on that point?—More facilities are given now. I wish to say that I have no wish to find any fault with the existence of things under Mr. Braidwood.

4705. What is your next point?—No. 7039.

4706. What do you wish to call the attention of the Committee to there?—Merely that the insured property should be regarded in a monetary point of view only, not as the number of damages which is shown here.

4707. That, therefore, those figures do not represent the actual state of things?—They do not represent the actual state of things.

4708. As you represent it?—As I represent it.

4709. The next question is with regard to this fire of which we have heard a good deal, namely, the King and Queen Granary fire, which is referred to in the evidence from Question 7056 to 7071; all that evidence was a question of discrepancy with regard to the time; do you wish to represent to the Committee anything upon that?—In reference to the question of the float getting to work, and also with reference to the difficulties under which they were placed in getting to work at that time.

4710. I think the Committee are fully aware, from the evidence which has been given, of the difficulty of getting the float, which drifted down the river, to work, and also of the question of time, which is a mere discrepancy as between two people taking the time, a thing which very often happens?—I have a copy of the entry in the occurrence book at the time, and what I particularly wish to call attention to is the state of the tide, which Mr. Swanton said was about quarter ebb; he says that in two places.

4711. You say that the state of the tide made it more difficult to get up?—Quite so; the lower it was the more difficult it made it for our operations.

4712. I think Mr. Swanton's evidence stated that it was the accident of the

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tide, though, as you say, he did not give the actual strength of the tide?—He said, "the tide or whatever drifted down"; he was not clear about that at all.

4713. What you would represent is that still greater difficulties really existed than have come out in the evidence as given?—Exactly; and the important point in that matter is that Mr. Swanton says it was quarter ebb when he was called; it was exactly one-third ebb, and it would have taken him 20 minutes to get there; it was nearer half ebb than quarter ebb.

4714. It seems to us that from the fact that the time of the tide was not properly represented in the evidence, the difficulties were greater than would appear from the evidence as given?—Just so.

4715. Is that all you wish to say on that point?—That is all I wish to say about that.

4716. What is the next point to which you wish to refer?—I wish to refer to Question 7099.

4717. Question 7098 is, "What do 'other damages' mean?" To which Mr. Swanton's reply was: "That the fire began at one place and burnt into 16 or 10 other places, as the case might be." And then Mr. Onslow asked the question: "Does that refer to damage from fire and water both?" To which he replied: "No; this would refer to fire damage only." What do you wish to say upon that point?—The damages refer to smoke, water, dirt, and removal. All those are included in the damages which we report.

4718. That it is not fire damage only that is recorded?—Exactly.

4719. Then with regard to Question 7117?—That refers to the fire at the Pantechnicon. All I have to say is, that the volunteer engine was the first to arrive and the brigade engine was half-an-hour after that; so I presume that it must have been rather late before Mr. Swanton got there. Therefore, I presume, he is not competent to speak. I think that was further explained in Mr. Swanton's last evidence.

4720. The next point is as to Question 7138; that is with regard to small and large manuals?—That is with regard to running manuals by hand.

4721. In that answer Mr. Swanton suggests: "I would have the steam engine at the station for the horses to drag about, transferring the manual to the police station to run about by hand"?—He said he had done it a great many times, and so have we done it a good many times; but it is not done by choice. It is not well that it should be done so, because a man after he had been running a quarter of mile with the engine is not at all in a condition to stand against a dense body of smoke.

4722. You would represent that you do not think that the change here suggested would be advantageous?—Quite so.

4723. Then your next point is with regard to No. 7142, is it not; that is with regard to the number of men required for fire-escapes; the answer was that "upon the old way of doing things, they had never formerly more than one man to manage one escape;" and that the relief men were not to the extent which is now suggested?—All that I have to say about that is, that they must have had a staff of supernumeraries or else the duties could not have been kept up in the case of sickness or leave, and so on.

4724. But, however, Mr. Swanton's evidence only goes to show, that while he admits there must have been relief men, they were not in the number of three men for two escapes?—There must have been the supernumeraries still to fall back upon.

4725. What you would represent is, that there must be to manage all fire establishments a supplementary staff of men who can be told off in case of sickness, or other emergencies?—Quite so. I should like to revert for a moment to Question 7138, on the question of having a steam engine at the station without a manual.

4726. That would be following out his suggestion that the manual engine should be removed to the police station?—Yes.

4727. You represent that that would be a disadvantage, from the fact that when the steam engine had gone to a fire, a fire breaking out close by the station very often necessitated the manual engine being used for that purpose?—Quite so. Then he also refers to stations where there are three or four engines being reduced to having one. I have a table here, which shows what existed in 1866.

He

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He says in answer to Questions 6999 and 7000, that it was a very different state of things to that which existed in 1865.

4728. Your table shows that the same state of things existed then?—Yes, it shows that, and I have it in print also, as given to the Metropolitan Board of Works from the old establishment, that there was one station which had five engines, one which had four, six stations which had three engines, and six stations which had two engines, and three stations which had one engine only.

4729. Then practically, at that time, the same state of things existed as does now?—Exactly; and I may say in addition to that that eight stations had steamers, and that in no cases were they left without a manual.

4730. The same plan was followed then?—Quite so, in 1865, and always has been so. I may also add that Captain Shaw was so strong in his opinion about it that he issued an order in 1871 to all the officers in charge of stations upon that very point, which is as follows: "Officers in charge of stations are cautioned not to run their steamers to fires at which they know they will be the first to arrive, unless they are certain to have a good working pressure of steam on their arrival. If they have the smallest doubt in the matter, they ought to take their manuals and not the steamers."

4731. That evidently contemplates on many occasions the use of a manual engine?—Quite so. I may mention that Captain Shaw has often stated that he attributes some of the heaviest losses in America to the fact of running the steamers, and not having manuals to run to fires in close proximity.

4732. So that not having time to get up steam before they arrived at the fire, they were of little use, whereas manuals could be at once applied?—Yes.

4733. The next point is with reference to Question 7145, which opens up a little dispute as to the labour of the different forces?—The men are very indignant about Mr. Swanton's answer in reference to that. I think he should not give an opinion at all as to the state of things which exists in the brigade, as it is 11 years since he left, and there is no comparison between what existed then and now.

4734. You would rather the Committee judged of that by the evidence which was given as to the hours the men were employed, than by Mr. Swanton's statement?—Quite so. I have here the whole of the men who gave evidence before, and I have others besides, who will be very glad to state the facts. I may say that the Board have, since August last, authorised Captain Shaw to employ supernumeraries in place of those sick or short, and that the order has been carried out at the present time. I should like to mention that my evidence is not given with any desire to exhibit the least antipathy to Mr. Swanton, but merely to assist the Committee, if possible, in putting the matter in a true light.

4735. All these other matters, in the proof you have handed me, appear to be matters of expression of opinion with regard to the head-quarters station and so on; matters which the Committee are able to judge of from the evidence, and to decide it between the evidence of Mr. Swanton and that of the men?—The only fear of the men was that the Committee might take Mr. Swanton's evidence, and that, as he had not for 11 years had an opportunity of judging, he was hardly in a position to give an opinion upon the state of things in the brigade.

4736. Mr. *Ritchie.*] I would wish to ask you a question upon one point, you having been many years in the brigade, and being a practical man. There are certain of the engineers who, I understand, do not belong to any of the classes into which the brigade is divided, but who are a special class of men by themselves. I refer to the men who take charge of the superintending stations?—That is so.

4737. Does your experience lead you to believe that it will be for the benefit of the brigade generally that these men should have some distinct position assigned to them?—Yes; I have always thought that.

4738. Would you recommend that they should be in a position which would entitle them to take command of the district in the absence of the superintendent?—I think it is very desirable it should be so.

4739. Will you state your reasons for thinking so?—The only reason I have is, that I think it would make the organisation better; inasmuch as those men are younger in the service than many other men who have charge of stations, and as the oldest officer when he got to a fire would take the

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Mr. *W. Hamlyn.*

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charge, the man immediately under the superintendent would, in many cases, not be able to do so.

4740. How many superintendents are there?—There are four at the superintendents' stations, and some at the chief station.

4741. You would represent that, inasmuch as their duties are more important than those of other men in the brigade, they should have a distinct position assigned to them separate from that of the other staff of the brigade?—Quite so; the moment they go out and the superintendent is absent they should take his place.

4742. That they have no power to do at present?—Only in cases where they got to a fire where all the other officers were junior to them; but they may go to a fire where an officer is senior to them who might not have the qualifications for carrying out that duty as well as the man who has the command of the superintendents' station, but who would take command all the same.

4743. Sir *Henry Peek.*] Have you read the evidence which you gave before the Committee last year?—Yes.

4744. Do you wish to qualify that in any way?—No.

4745. Have you read the evidence given by Mr. Port and Mr. Duck, and the men of the brigade?—The whole of it.

4746. Do you find any serious mistake in the evidence which they have given?—No, I agree with it all.

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Monday, 14*th May* 1877.

MEMBERS PRESENT:

Mr. Clifton.	Mr. M'Lagan.
Mr. Forsyth.	Mr. Onslow.
Mr. John Stewart Hardy.	Sir Henry Peek.
Mr. Hayter.	Mr. Ritchie.
Sir James M'Garel-Hogg.	Sir Henry Selwin Ibbetson.
Mr. Kinnaird.	Mr. Young.
Mr. Locke.	

SIR HENRY SELWIN IBBETSON, BART., IN THE CHAIR.

Mr. *Charles Few*, re-called; and further Examined.

Mr. *C. Few.*
14 May 1877.

4747. *Chairman.*] I UNDERSTAND that you wish to make some further remarks with regard to answers to Questions 4695 and 4696, in which, when I asked you whether, from your own knowledge, your company or the other companies had made representations at any time to the Metropolitan Board of Works with respect to the fact that they had constantly charged mains upon which hydrants might be placed, your answer was, that you believed the fact had been made known to the Metropolitan Board of Works; and in answer to Question 4696, you said you were not quite certain how far the matter had been placed before them. What is there further that you would wish to place before the Committee?—I beg to produce the last report of Major Bolton, the official water examiner, dated the 10th of April last. His reports are issued monthly, and I am given to understand, from inquiries made at his office, that two copies of those reports are always sent to the Metropolitan Board of Works. I would beg leave to read his general remarks, which are contained in paragraph 13, which will show that the fact is communicated from time to time to the Metropolitan Board of Works: he says,—"The number of miles of streets which contain mains constantly charged, and upon which hydrants for fire purposes could at once be fixed, in each district of the metropolis, is as follows—Kent, 80 miles; New River, 173; East London, 85; Southwark and Vauxhall, 100; West Middlesex, 70; Grand Junction 41½; Lambeth, 70; Chelsea, 50; making a total length of 669½ miles, and the water companies are ready to affix hydrants thereon when required by the authorities. The total number of hydrants erected is at present 4,261, of which 2,735 are for private purposes, 541 for street watering, 510 for public use, and 475 in Government establishments."

4748. You would represent that that report being forwarded to, and being in the possession of, the Metropolitan Board of Works, they were aware from that of the conditions of your companies with respect to constantly charged mains, and the possibility of placing hydrants upon them?—I merely said last Thursday that I believed the fact had been made known, and I adduce this report as my authority.

4749. Though your companies have not, by a series of correspondence, as the two companies who have been examined before this Committee have done, brought this matter to the knowledge of the Metropolitan Board of Works themselves, still they are aware that it has been so brought by Major Bolton?—Quite so.

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Captain *Eyre Massey Shaw*, re-called; and further Examined.

Captain *E. M. Shaw.*

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4750. *Chairman.*] I BELIEVE that before we enter into the new branch of the inquiry, there are one or two points to which you wish to call the attention of the Committee. The first of those points, as I understand you, is with regard to Question 1061. That question related to the system adopted in cities on the Continent, which you would recommend for adoption here, and your answer to that was: "I know of no means in any part of the world which are fit for London that we have not adopted as far as it was possible to do under our circumstances. I can give information about many of the cities of America, if desired, and also Paris, Hamburg, Berlin and others; but I know of nothing in any of those cities which is at all applicable to the condition of things in London." On that answer you wish to make some representation to the Committee?—Upon that and upon some of the questions immediately succeeding that, particularly in my answer to No. 1068, in which I promised to prepare something for the Committee.

4751. In which you promised to prepare a Table of cities of importance containing the information?—I now present that Table. It was quite impossible for me to put in the authorities with all those entries, but I can now produce my authorities, and I can then answer any question which may be asked me to-day. (*The Table was handed in.*)

4752. Looking roughly myself first before we go to any further questions, at the estimate you have put in, I see that if we take four of the principal cities, namely, London, New York, Paris, and Chicago, the population in London is 3,500,000, as compared with 1,068,000 in New York, 1,986,000 in Paris, and 550,000 in Chicago; while the number of firemen in London is 406, as compared with 869 in New York, 1548 in Paris, and 405, or within one in Chicago of the number in London. The annual cost of the London fire brigade is 80,000 *l.*, the annual cost of the New York fire brigade is 249,600 *l.*, the cost in Paris of the fire brigade is 100,000 *l.*, and the annual cost in Chicago, where the number of firemen is the same as in London, is 111,000 *l.* The value of the plant in London is 45,000 *l.*; the value of the plant in New York is not given; but the value of the plant in Chicago is 192,890 *l.*, showing that in London we have far fewer men than any of them. That we have the same number with 3,500,000 of population as Chicago with 500,000, and that the cost in London is considerably below the cost in any of the other three cities?—Yes, I think that is the general result of the Table, but at the same time it is to be remembered, as I have always told this Committee, that every man of ours as a rule represents more than every man abroad. That our men are much more trained, and in point of fact, much more useful. There are many of those cities in which they have a great number of firemen, but there are really not more skilled firemen than we have here; that is to say, that the mere numerical account of these men does not represent their actual strength, but might lead this Committee to an exaggerated view of their real strength.

4753. With regard to the men in Paris and in New York, which perhaps are the two cities which this Committee would wish to compare with most. There they have a great excess of men, but that would not represent a great excess of efficiency in proportion to their numbers?—Up to the time of my last visit to New York, which was only a very few years ago, there was no system of training at all there. There is now a system of training adopted in New York; how far they have progressed since that time it is not for me to say, but I presume they are getting on.

4754. You are aware that what has been brought before this Committee with regard to this system in New York gives a very florid description, at all events, of the rapidity with which the work is done, and apparently, from their statements, of their efficiency there?—I have not seen any evidence to that effect, but there is no doubt they are very quick in turning out.

4755. I refer to the mechanical rapidity with which everything is done; my attention has now been called (I do not know whether your attention has been called to it), to a statement which was made by the chairman of the Cleveland Institute of Engineers, Mr. Whitwell, with regard to his investigation into the system

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system in New York, and in that he states that the rapidity of what he calls the Intelligence Department, which means the communication by electric telegraph, is so much greater in New York, that they are able to turn out in so many seconds, almost; the horses, harness themselves, as it were, and the whole engine is ready to start in 17 seconds from the time of notice, which shows a very considerable increase of rapidity over what we were led to suppose existed in New York; the words of the quotation are these: "The men were all asleep, and the chief of the fire brigade gave the alarm; the horses, five of them, rushed up, let loose by the telegraph; five seconds after the gong had sounded the men came down stairs; the hook and ladders" (that is, their fire escapes), "all ready in 17 seconds, and the steamer in 19 seconds"; he says the trial was repeated with varying results, but amounting always to the same time in the end, namely, 19 seconds?—There is no doubt that their mechanical arrangements, in many ways, are perfect in America, but then it is to be remembered that those advantages are only obtained at the enormous cost that I have given in that Table. In the case of New York, for instance, they spent last year 1,250,000 dollars.

4756. Amounting to 249,000 *l.*?—Yes, and I think we could obtain better results in this country for less money.

4757. The principal points which seem to come out of that are the greater facilities which are afforded there for telegraphic communication between the different stations?—And that, also, is attended with very great drawbacks, because their false alarms are very numerous. The facilities afforded by them for giving calls are, to a certain extent, misused by the public, and the result is a number of false alarms wholly out of proportion to anything that we know of or would tolerate here.

4758. Have you any return of the number of those false alarms in America?—It is stated in the return.

4759. Out of 823 fires in New York, the false alarms were 114?—Yes; as far as I can make out; it is exceedingly difficult to read some of the American Tables.

4760. Whereas out of 1,787 fires in London, 91 were what are put down as false alarms?—Yes.

4761. Is there any other point which you wish to bring out with regard to these Tables?—Not that I remember at present.

4762. The next point to which you wished to call the attention of the Committee was with regard to your answer to Question 1759, I think; the question there was: "It is immaterial to you whether a man comes from the Royal Navy or from the Merchant Service, is it not?" and your answer was: "It used to be so, but now it is not so; I prefer the Merchant Service"?—That was the last of a series of questions upon the subject of the class of men whom we employ for our purposes, and it is a point of considerable professional importance to us. I thought it better to bring the matter up and allude to it this morning. First of all, I may say that we have always found that for our work, with a very small number of men doing a large business throughout the year, it is well to have sailors, because they so very rapidly acquire the necessary knowledge for working at great heights, which men not accustomed to climbing would hardly do. Then the question arose as to what class of sailors we employ, and for the purpose of explaining it to this Committee, I have brought up this morning three drawings, which I present, showing the different classes of ships from which I take them. (*Producing the same.*) No. 1 shows a vessel of the Royal Navy 20 years ago; No. 2 shows a vessel of the Royal Navy of the present day, the last type produced; and No. 3 shows a merchant ship of the present day. I think it will be obvious to the Committee after a glance at these three drawings why a merchant seaman can now be more easily trained for the duties of a fireman than a Royal Navy seaman. There are still good climbers to be obtained from the Royal Navy, but not in the same numbers as formerly, and I have purposely selected these extreme types of vessels to illustrate the change which has taken place. In short, a comparison between No. 2 and No. 3 will show that in the former the principal duty of the men lies on the deck, and in the latter aloft amongst the rigging. There is also an authority on this subject which may probably be known to many members of the Committee. It is found in Mr. Brassey's book on "British Seamen," in page 114, and is as follows:

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lows: "The composition of crews in ships of war has so much changed of late years that the seamen proper do not, as a rule, exceed one-third, or at most two-fifths of the ship's complement. These again, exclusive of petty officers and boys, are divided into three grades, ordinary second class, ordinaries, and A.B.'s, the latter usually representing but one-eighth or one-ninth of the crew of a ship." I presume this will sufficiently explain my reasons for taking more merchant seamen than blue jackets during the last few years.

4763. You think the Merchant Service now takes the place of what used to be the Queen's Service, in the way of education for sailors for the purposes you want; that is for going up heights?—In the way of climbing men. The Merchant Service still provides a large number of climbing men, and the Royal Navy supplies some small number of climbing men; that is stating the fact in general terms.

4764. They are principally engineers and fighting men now in the Royal Navy?—Precisely, but I still take Royal Navy seamen, for I am very often glad to get them

4765. Discipline in both cases is the very important element which you wish to secure?—We have our own discipline now. I think we are independent of any previous training in the way of discipline; I am afraid the discipline in the Merchant Service is hardly to be trusted for anything; it is a series of short engagements which entirely destroy all ideas of discipline in that service. We are quite independent of that discipline whatever it may be, and have our own discipline.

4766. The next point I think you wished to refer to was, in answer to some evidence which was given this year, namely, No. 45, in which Mr. Chadwick was asked: "You think that in his estimate," (speaking of Mr. Berrey) "and in the estimate of the other engineer whom you had to consult, the large expense which has hitherto been an obstacle to laying down those hydrants in London ought not to exist." To which he replied: "Not to the extent of one-half of that which has been stated. Captain Shaw introduced a very good hydrant, I believe, which he talked of as being laid down at a cost of 10 *l.*, and Mr. Swanton says he has a patent for it, and he wants 10 *l.* a piece for them, but they may be done for far less than that;" what remark do you wish to make on that?—I wish to be allowed to observe with regard to that answer, that Mr. Chadwick is entirely in error in that statement. I am not the holder of a patent for any appliance of that kind whatever, or for any fire-extinguishing appliance. I have had opportunities at various times of taking out patents for various articles of this kind, but I have persistently refused to do so. There have been occasions on which I should have gained sums much larger than my salary for doing so. The only case in which I took out a patent at all, was about 13 years ago, before the fire brigade was under the Metropolitan Board of Works, and the payment for it was made by my employers, and that was dropped at my request, because I considered it was not consistent with my public position in London to hold any patent in connection with my business.

4767. Thinking that it might be misrepresented?—Precisely so; in fact I provided for such statements as those which Mr. Chadwick has made. Mr. Chadwick has given his authority for it, and I think he must be mistaken, because Mr. Swanton was in my employ at the time and was aware of the whole of the circumstances; therefore, I can hardly suppose he told Mr. Chadwick that. At all events as a matter of fact, I wish to say to this Committee that I am not a holder of a patent for that or anything else. I may say that I endeavoured through the Society of Arts to get this correction made by Mr. Chadwick but I have failed, and therefore I thought myself obliged to mention the matter myself.

4768. I think you wish to refer next to the Question 7039 in the evidence of last year?—Yes. In reply to Question 7039, an answer was given by the superintendent of the salvage corps concerning the proportion of losses on insured and uninsured property. Now, if that was meant to show that the salvage corps is unable to deal with more than one-fifth of the property endangered, and requires public or any other aid for saving the remaining four-fifths, then, with a complete understanding of the whole subject, I wish to say that I deprecate, in the strongest manner, the introduction of any additional forces to attend fires at the present time.

4769. You mean any additional independent forces?—Yes, any additional independent

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independent forces. We have already the police, the fire brigade, the water companies, and the salvage corps, all under separate governments, and yet continually working, or endeavouring to work together for a common purpose. Every additional separate force which is added will cause complication, and it would be much safer for the interests of all concerned either to increase the salvage corps to the necessary strength, or to make them work with a little more energy, in order to save general property, as well as the property of the insurance companies. If it should turn out that the salvage corps cannot be increased, or that they cannot work with greater energy, then I should recommend that an arrangement be made, upon the part of the uninsured public, with the police, or some other regularly and legally constituted authority, to save the property.

4770. I suppose the uninsured public are difficult to move, from the fact that, if they were easily moved by their interest in the matter, they would insure?—Quite so.

4771. So that the salvage of uninsured property must be a public undertaking; you would not persuade those who will not insure, to do anything towards creating an additional security in the way of salvage?—I hardly understand the question.

4772. If the people really care for the question of salvage, those who do not insure would insure their property; and therefore if you suggest that the public, who are uninsured, should be protected by some body, it must be a public undertaking, with the public payment of such additional force, and you would not be able to secure that payment from the people whose property would be protected by that body?—I see no reason why the expense should not eventually be recovered from the persons who receive special benefit; that is done in certain cases.

4773. You would protect them, whether they liked it or not, and then recover the amount of cost for their protection from them?—Yes; I think that voluntary aid might be freely and largely introduced, but that it should be under the control of parties legally authorised. I should not approve of voluntary aid being brought in, unless it was placed under the control of some responsible authority.

4774. You think there are too many heads already, and that the addition of another head would cause greater complication?—The addition of another head would cause greater complication, but the addition of an irregular body, not under the head, would cause further difficulty.

4775. Sir *Henry Peek.*] Prudent people would pay twice according to your scheme, would they not?—I am afraid that prudent people pay twice now; the insured are paying twice.

4776. *Chairman.*] But I understand you to say that the recovery of the amount would only be from the owners of property saved, and therefore would fall on the uninsured?—Precisely so.

4777. Because the salvage corps already deal with the property of those who are insured, and under the new system the police would undertake the salvage of uninsured property, and you would allow the costs of that system to be recovered from the uninsured people whenever their property was saved?—Quite so; my reason for adverting at all to this, which I consider very remarkable evidence, as coming from a source like that, is to point out the extreme danger to a city containing valuable property, having its safety entrusted to so many separate organisations, and I am taking this opportunity, which appears to me to be the only one likely to arise, for giving my official opinion that not only the insurance companies, but also the general public would lose very largely by any arrangement being made, which would have the effect of scattering still further the responsibility, which is, in my opinion, already too widely diffused. I have no desire to make too much of a point like this, but I do say it is somewhat hard upon the fire brigade to have its success or failure estimated according to the ultimate pecuniary loss which falls upon those concerned. I think it is a point which has been far too little considered in this town. If the success or failure of a fire brigade has to be estimated according to the pecuniary value of the property ultimately saved or lost, it is clear that the brigade should have the entire charge of all the arrangement, including the fire-engines, police, turncocks, and salvage corps, and I am sure that nobody wants this. At present we extinguish

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a fire as rapidly as we can, doing the smallest possible damage by water, but, once we have done this, we have no further responsibility at all. We have no power to work the salvage for the uninsured public, or to compel the salvage corps to work it for the fire offices. I presume the Committee will understand my point here, which is to show that the actual loss caused by a fire may be, and in many cases is, considerably less than the pecuniary loss eventually resulting to those concerned, and that for the difference between the two there is no responsibility of any kind upon a fire brigade.

4778. All that would rather point to the concentrating in the fire brigade, a general salvage corps for all property, with a power of recovering for the amount saved?—I think, theoretically, that that would be the correct way of doing the best for a town, but practically there would be, of course, many difficulties. I do not wish to say anything in disapproval of the system of having a salvage corps; I think it is a very good system, but I think that when a salvage corps exists, they should step in and do immediately what is to be done. I disapprove of the delays which have taken place in London. I consider that many heavy losses have taken place in London after a fire has been extinguished, and before the property has been realised.

4779. That strengthens still more the expediency of one command and one system, because these delays would not then be possible?—The matter may be considered in that light, but that was not the light in which I wished to present it. I wished to consider it in that light which has not been presented here, but which has been referred to by the representatives of the fire offices.

4780. I understand you to wish to say, that a great deal of unfair blame is thrown upon the fire brigade from the fact of the delays which occur in the salvage of property?—Yes.

4781. That clearly points to the system being faulty to an extent which would require, in order to make it perfect, that it should be united under the same authority, and should work with the same motive power?—Precisely.

4782. Under such a system, if a power were given to recover for the salvage made, you would recover from the insurance companies where property was insured, and from the owner in case of uninsured property?—Yes; I presume the working of such a system would be that you would, in every case, recover from the occupier, the owner of the goods, and afterwards he could recover from the insurance company, if his arrangements were made to that effect.

4783. But it would be one system which would deal with all the salvage throughout the town, and would at once get rid of any difficulty which is suggested in Question 7039, with regard to the same interest not being taken in the salvage of uninsured property as of insured property?—Quite so. I have no reason to believe that Mr. Swanton had any authority from the fire offices to give that particular evidence, but whether he had or not, I think the general public would be heavy losers by any such arrangement, and I think the insurance companies would also be heavy losers.

4784. The Committee understood that Mr. Swanton was expressing his own opinion upon that point?—I presume it must be his own opinion, because I am quite sure that the insurance companies would not instruct him to express that opinion; it is just as much against their interest as it is against that of the general public.

4785. I think the next point to which you wish to call attention is in question 3361 of this year's evidence, which refers to the requirements which you said ought to be able to be met in case of fire, namely, 2,100 gallons a minute?—Yes; in reply to that Question 1336, the engineer of the New River Company has added certain words to my evidence in answer to Question 203 of last year. My answer then was: "Our requirements are simply to have a supply of about 2,000 gallons a minute ready for immediate delivery within such distance as (we will say) 14 engines can work on a fire, not using more than about half-a-mile of hose. Those are our requirements, and they seem to be very small when they are looked at in that point of view." Now if you will allow me to read the statement of the engineer of the New River Company as to my evidence; at No. 3361 of this year's evidence, he says: "Captain Shaw wants that to be delivered within a very small area; he wants it delivered within such an area that 14 lines of hose, having an aggregate length of half-a-mile, would be able to reach it and pick it up, and throw it on a fire." Now those last words,

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words, "pick it up and throw it on a fire" are an addition to my evidence, and alter the whole character of it upon this point. A reference to my answer to Question 203, which I have just read, and several others which follow, will clearly show that in every case I contemplated fire engines picking the water up and throwing it on the fire. I presume the engineer in question had only read the newspaper account, or a summary of my evidence, as I am quite sure that if he had heard it given, or had read it in the printed Minutes, he would never have made that addition which so entirely alters its character; and, in fact, made me ask for that which I know as well as he does, is at least for the present impossible. The engineer of the East London Water Company has fallen into the same mistake, and, I presume from the same cause, that he must have read some newspaper account.

4786. I think Mr. Hack, of the Kent Waterworks Company, stated that he thought that in several portions of his district your requirements could be met?—I rather think that several of these gentlemen have said so, but if the Committee will allow me to proceed with this point, I would say, I can prove that I have not asked for anything which is impossible. I may tell the Committee that my requirements in this way have been occasionally almost met. At the Pantechnicon fire, for instance, I received from the Chelsea Waterworks almost the precise quantity, which I named in my evidence as our maximum requirement, although the total length of our hose was more than I said, because it was a mile and a quarter. There can be no room for doubt that on that occasion, if the plugs had been nearer, our requirements in all respects would have been more than met. Even in the East London district I have on more than one occasion received from 1,300 to 1,400 gallons of water a minute, and very frequently about 1,200 gallons a minute. It is true that in all the cases the length of hose in use was very considerable, amounting probably to about three-fourths of a mile, and involving a considerable loss of time in laying out, and so forth; but the quantity of water delivered shows somewhat satisfactorily that the fulfilment of my requirements is very far from an impossibility. Indeed there was one occasion on which I received 1,600 gallons a minute from this same company, the East London, with a total length of hose of less than three-fourths of a mile. I am prepared to give further instances of very large supplies of water from various companies, but I presume that what I have said will be sufficient for the purposes of the Committee.

4787. I was referring just now to Mr. Dickson's evidence with regard to the Kent water supply, where your 2,100 gallons comes into question, at Question 4237, in which he was asked: "And therefore your power of meeting that draught is greater than would be inferred from that evidence?" that was the evidence of Mr. Bramwell. Mr. Dickson said, "Yes, I do not think that Captain Shaw's requirements would overtake what our engineer could supply, when you consider the large quantity which is in store to start with." And then at Question 4238, Mr. Dickson was asked: "Therefore, even supposing, which has not been disputed, the necessity of giving any such supply at one point, do you believe the capacity of your reservoirs, and your means of delivery, would meet that demand?" to which he replied, "The capacity of the reservoirs in their respective districts has always proved amply sufficient for fire purposes under the demands which have been made on them, and the means of delivery might, in some places, satisfy the very large demand which Captain Shaw has put forward, but in the greater portion of the district the pipes could not convey such a quantity; and, I may add, there are few places in the Kent district where it would be likely to be required"?—If the Committee desire to get any further information with regard to large supplies of water being given to us, I can give it. At Her Majesty's Theatre in the Haymarket, in 1867, we used 1,500 gallons a minute from the Chelsea and Grand Junction Waterworks Companies.

4788. Can you state the number of engines which you had at work upon that occasion?—I had 10 steam engines at work there.

4789. Mr. *Stewart Hardy.*] Did you actually use that quantity of water, or was there much waste?—That was what we used. I am afraid there was a very considerable waste besides on that occasion.

4790. *Chairman.*] There was a considerable supply given to you upon that occasion,

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occasion, and therefore your requirement was met?—Yes, we actually used upon that occasion 1,500 gallons a minute.

4791. Mr. *Forsyth.*] How do you tell what quantity you use?—Each engine, at every stroke, passes a certain amount of water through, and the man in charge of the engine, when he gets home, takes account of the number of strokes made.

4792. *Chairman.*] So that you get an absolute record of the consumption of water?—We get an absolute record of the consumption of water as precisely as it is necessary for us to have it for our purpose; certainly within 1 or 2 per cent. of the quantity consumed. Then at the Oxford Music-hall, in November 1872, we used 1,200 gallons a minute, which we received from the New River Company and the West Middlesex Company. At Queen Anne's Gate, in October 1875, we used 1,500 gallons a minute, from the Chelsea Company's supply. At a fire in Leather-lane, in 1874, we used a little more than 1,500 gallons a minute of the New River Company's water. At a fire in Cow Cross, Smithfield, in 1875, we used 1,300 gallons a minute of the New River Company's water. At Christian-street, St. George's-in-the-East, in April 1870, we used about 1,300 gallons a minute.

4793. That was in the East London District?—Yes, that was in the East London District; and then, in July of the same year, at Cable-street, the East London Company supplied us with, or rather we used, 1,120 gallons of their water per minute. In Brick-lane, Spitalfields, in May 1873, we used about 1,300 gallons a minute of the East London Company's water. In Wellclose-square, in May 1874, we used 1,400 gallons per minute of the East London Company's water. In Denmark-street, St. George's-in-the-East, in January last year, we used 1,600 gallons per minute of the East London Company's water. In Southwark-street, in July 1874, we used 1,100 gallons a minute of the Southwark and Vauxhall Companies' water; and in Spa-road, Bermondsey, in November 1874, we used 1,600 gallons a minute of the Lambeth and Southwark and Vauxhall Companies' water.

4794. I suppose in all those cases that supply was given from the plugs on the service pipes?—From the plugs on some pipes. According to the evidence which has been given to this Committee, it would appear to be chiefly from the service pipes.

4795. According to the evidence from the companies, their constantly charged mains are not fitted with plugs?—I read that evidence, and until that evidence was given I was under the impression that there were remaining in London still a large number of plugs on mains.

4796. As we are on this point I would like to ask you one or two questions about it; have you read the evidence given by the water companies before this Committee?—I have read it.

4797. And seeing that they state that they have this number of miles of mains, that is of their larger pipes, constantly charged, on which plugs do not at present exist, does it at all tend to strengthen your view of the desirability of having hydrants affixed to such constantly charged mains. I understand you to have on more than one occasion expressed the view that hydrants should be so affixed for facilities for fire purposes, setting aside the question of expense?—Setting aside the question of expense, I should suppose it would be a very great advantage to have proper means of access to the water in the pipes, both those constantly charged, and those intermittently supplied.

4798. What I wish to know is whether you do not think that where you have large mains, that is to say, the largest system of pipes in the town, constantly charged, at present unavailable, any system which would make them available would give immense additional facilities to the working of your brigade?—I think it would, if the question of expense is left out of the question altogether.

4799. I am not asking about that, but I am asking about the protection of London from fire, whether it would not add immensely to your power of giving additional security if you had the means of getting a so much larger supply as you would then be undoubtedly able to get, from the larger pipes constantly charged?—Undoubtedly it would do so.

4800. At present, I understand you to quote instances in which you have got a sufficiency,

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a sufficiency, or almost a sufficiency, up to the requirements you have mentioned from the existing service pipes of the companies?—Yes, from the existing pipes which now appear to be principally service pipes.

4801. And, therefore, if the facilities suggested by the companies with regard to their constantly charged mains were available for your purposes, the probability is that your requirements with regard to the 2,000 gallons a minute would be equally met?—My impression is that that is so, but of course in that view the question of expense is put out of consideration altogether, as it seems to me. I speak altogether as a fireman.

4802. The question of expense is a matter upon which I did not ask you, because I did not think that you had anything to do with it. The question is whether, speaking from your capacity as head of the fire brigade, with regard to the protection of London from fire, you do not believe that you would get a very great additional security from the application of hydrants to the constantly charged mains?—Speaking only as a fireman I have no hesitation in saying that we should.

4803. You have heard, and are aware, from Major Bolton's Report, that 600 and odd miles of such constantly charged mains do exist in the town?—I am.

4804. An honourable Member wishes me to ask you, in regard to your statements with reference to the number of gallons of water which were delivered, if you could give the Committee any idea of what the waste in each instance had been?—I am afraid that I am quite unable to answer that question.

4805. Have you no method of testing the waste?—There is no precise method of testing. Even the water companies could hardly say what they had lost through us, and what they had lost in the buildings through us from turning off the water to a particular district. I may explain that by saying that, in order to give us the water, they are obliged to turn on the water for the whole district. They are obliged to turn it on in the houses, and the waste occurs not only in the places where it is seen, but in the houses where it is not seen.

4806. I understand you to say the first thing the water does when the service-pipes are turned on, is to fill up all the cisterns in the district before it becomes available for your purposes?—Before the water becomes fully available for our purpose.

4807. The water runs to waste, does it not?—Quite so; it may run to waste to a considerable extent in those places.

4808. In addition to the waste which takes place from the plug itself?—Quite so.

4809. The latter, I understand, is a waste which takes place not only at the time of the fire, but subsequent to the fire, before they get the plug re-established?—Yes.

4810. But if you had hydrants in the street, that waste would be practically avoided?—Quite so.

4811. Supposing the hydrants to be on the service or intermittent supply-pipes, then the other waste which you have suggested as taking place in the houses would not be diminished, while it would be diminished in the street, but wherever you placed hydrants on the constantly charged mains which are not subject to the intermittent supply, you would practically do away with the waste entirely?—Yes, we should then do away with the waste entirely.

4812. I do not wish to labour this question. I wish only to get at your own feelings; I see by your evidence before previous Committees and this Committee, that you do believe that a hydrant is a far more efficient way of getting at the water than plugs are?—I think there is no room for doubt upon the subject.

4813. And you now state that, looking at it from a fire point of view, and in the interest of doing the best for the suppression of fire in the metropolis, a system of hydrants placed upon constantly charged mains would increase your facilities immensely?—It would undoubtedly do so.

4814. I wish to call your attention to Question 1696 of last year's evidence; that question referred to the use of chemical means for extinguishing fire as an additional assistance to your brigade, and in your answer to that question you stated: "I think there are many classes of goods which would be utterly destroyed by any chemical that I have seen yet. For instance, articles of food would

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would be quite destroyed; I do not suppose that they would be fit for use after having chemically prepared water poured upon them, and many articles of clothing would also be unfit for use; although the articles would, in some fashion, be saved, yet as articles of commerce they would be entirely destroyed;" I wish to ask you with regard to that, whether you have heard of the chemical introduced by a man of the name of Sinclair; Dick and Sinclair's chemical appliance; has that been one of the chemicals brought under your notice?—I presume it has; I do not know it under that name, but I have seen every chemical that has been invented for putting out fire.

4815. Are you aware what the chemical substance used there is?—I am told it consists of the same ingredients as are used in the Seidlitz powders.

4816. Are you aware that bicarbonate of soda and a small amount of sulphuric acid enter into the ingredients?—I have been told so.

4817. Do you believe that these ingredients would damage articles of food and clothing?—I do not think that is a question which I could answer very precisely; that is a question rather for chemists. My position in the matter would be that I should positively refuse to use such things until I got specific authority for the use of them. I have always declined to become an advertiser for any of those persons who sell chemical or other fire extinguishing appliances. If the materials which he uses are good he should get an opinion from a chemist to that effect, and if he can get the public to adopt it, in all probability we should not object to use it, but I should very much object, as a public servant, to use any chemicals for the goods we generally have to deal with.

4818. Are you aware of the number of fires which have been extinguished by that chemical preparation; I ask you this question because your answer to the question in the former evidence, if it goes out in that form without qualification, may practically do a serious injury to the people interested in the concern?—No, I am not aware; I occasionally read newspaper reports, and I read advertisements of large numbers of fires being got under by them.

4819. Would you be surprised to hear that as many as 8,000 fires have been extinguished by that process?—I should be very much suprised to hear it.

4820. And that no complaints have been made as yet upon that subject of damage?—I am not aware of that.

4821. Would you, therefore, qualify your previous statement that those chemicals would damage the goods to the extent you describe?—My evidence did not go so far as that, but only to the extent that I, as a public servant, would not consider myself justified in using chemicals for the extinguishing of fire, because of the damage which might result from their use; of which I am unable to assess the amount. There is no doubt that in many cases the use of chemicals would do an injury, although, perhaps, there might be thousands of cases in which they would not.

4822. But if a fire was extinguished by chemical apparatus (and the statement is that it is occasionally done), in a very much shorter time than it is extinguished by water, perhaps a certain small amount of damage which might arise might be counterbalanced or overcome by the larger amount of salvage?—That is quite possible, but that is a matter for private persons to deal with, and not for the fire brigade.

4823. It would become a matter for the public authority if it could be shown that, although that chemical material did a certain amount of damage, yet the salvage which resulted overbore that amount of damage?—Quite so; I have always looked forward to the time at which some chemical appliances might be added to our stock, but I have certainly never seen any yet that I would venture to add on a large scale.

4824. Now, with regard to two branches of evidence which the Committee had before them last year, one the superannuation scheme, and the other with regard to the head-quarter station; since your giving that evidence has any action taken place either with regard to the one or the other; we will take the superannuation scheme first?—Yes; the Metropolitan Board of Works have taken action in both those cases.

4825. Can you describe to the Committee what has been done subsequent to our last year's inquiry with regard to the superannuation scheme?—With regard to the superannuation scheme, the Metropolitan Board of Works have passed a scheme, and the men have accepted it That scheme, which came into operation

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tion on the 28th of January last, has already had the very important effect of giving us five steps in the brigade, which have been very much appreciated by all ranks. This is a copy of the superannuation scheme. (*The same was handed in.*)

4826. And, as I understand you, this scheme has been accepted by the men of the brigade?—That scheme has been accepted by the men of the brigade.

4827. I understood from the evidence which we had before the Committee last year upon this point, that the men expressed a desire to be placed in the same relation with regard to their pensions as the metropolitan police, with their scale?—They did so.

4828. Does this scheme bear any relation to that?—I think, more or less, it does, although it is not precisely the same scheme.

4829. But that whilst the men then expressed a desire to be placed on exactly the same conditions with regard to pension as the metropolitan police, they have accepted this though it does not bear the same proportions?—Precisely; the men have accepted that.

4830. May the Committee consider that they have, therefore, abandoned the idea of wishing to be placed upon an equality with the metropolitan police in this particular point?—I think they desire very little variation from that superannuation scheme. The Board is aware of the only desire that they have, which is upon the subject of age, and it is not impossible that some day that might be met, but nobody but the Board can make the alteration.

4831. But that scheme is, as far as you are aware, satisfactory to the men?—The scheme is, on the whole, satisfactory to the men. There are certain details which they wish altered.

4832. Now, with regard to the second point, namely, the head-quarter station, what has the Board decided upon that?—The Board has decided to build a head-quarter station, with all the necessary requirements, in Southwark Bridge-road, and the workmen are at present engaged in the construction of the new station.

4833. Was that the site which is referred to in No. 3206, when Mr. De la Hooke says: "I do not know what will come of it" (the site then being considered by the Committee), "but Captain Shaw has been consulted, and he thinks the site would be very suitable"?—I think that must be the same building, but I cannot find anything to show that it is so.

4834. I understood you to have, in correspondence with the Metropolitan Board of Works, recommended a site for a head-quarter station on the Thames Embankment; that is to say, on the north side of the river?—I did.

4835. This site is not on that side?—This site is not on that side of the river, nor is it upon the water-side, for it was found by the Board impossible to get a place on the water-side.

4836. Does this site meet those requirements which you intimated were necessary for a head-quarter station in your representation to the Metropolitan Board of Works on the subject?—Yes; I think it meets them in all respects, except in that one which it was ascertained could not be met at present; that is to say, having the site upon the side of the river; in all other respects this is a satisfactory site, and I have no doubt it will turn out very well.

4837. In answer to Question 6389, I see Mr. Lovell, for the insurance companies, represents that they objected very strongly to the head-quarter station being removed from the City, where so much valuable property was collected; those questions all relate to his alarm at the idea which was suggested that the central station should be removed from its present site to any other part of London?—I see no force at all in anything he has said there.

4838. You see no force in the fears expressed by the insurance companies that you were gradually diminishing the strength or power of the brigade in that part of the town where they represented the most valuable property to be collected?—Mr. Lovell evidently has not received advice from anyone who was practically acquainted with the subject; as a matter of fact, that part of the City will be stronger, not weaker, by the change.

4839. You represent that, as a matter of fact, the moving of the head-quarter station will not diminish the security given to that part of the city?—No, it will not.

4840. Do you propose retaining the Watling-street Station as one of your

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stations?—Nothing has been decided on that point at present, but I assume that it will be the case that the Watling-street Station will be kept on still as a station, and it is upon that assumption that I say the City will be stronger and not weaker by the change.

4841. You represent that while you retain the station they have, and will have, the additional advantage of the proximity of your central station?—Yes; but I do not think that it would be advisable to keep up the station in its entirety. I think that that station may then be considerably reduced and made appropriate for the place.

4842. And still you think the City will retain as great a power for suppressing fire as they have at present?—I think they will have greater facilities for suppressing fire than they have at present.

4843. In what way?—At present the head-quarter forces are too much scattered. We have our office, and a few men living in one place; the drill men living in another; the fire-escapes in a third, and the workshops in a fourth.

4844. I meant by my question, that while you retained your existing station in the City, you would give to the City the greater efficiency of an adequate central station?—Precisely.

4845. In your opinion, I understand you to say, that in order to maintain that security, that station should be retained as one of the district stations?—I think that that station ought to be left there, and I have no doubt it will be, because I have never heard it suggested that it should be taken away.

4846. After Captain Harris's evidence had been given to the Committee, I do not think you had an opportunity of speaking upon the point either of utilising or amalgamating the police in conjunction with the fire brigade?—I think Captain Harris gave his evidence after I did.

4847. I would like to ask you upon that point, combining his evidence with the evidence of the water companies, whether you think that what has been suggested by all those witnesses would not be an advantage, that is, that by a combination of the brigade with the police force, as a separate branch of it, you might avail yourself of all the police stations as points at which appliances for fire purposes might be placed, and might still further enlarge your power of utilising the standposts of the police in the streets, both for fire appliances in the way of hose, and for telegraphic communication?—I am quite of that opinion.

4848. And that you might in that way nearly approach to a system of universal intelligence by having telegraphic communication to the brigade from the police stations, keeping them all in telegraphic connection, and thus utilising the nearest points for each fire?—I think so.

4849. Getting the additional security that, if hydrants were placed on the mains, the hose might often be made available by the policeman on duty before the brigade arrived to take charge of it?—I think there can be no doubt upon that point, but of course there are many difficulties in it, and I think those difficulties ought to be taken into consideration.

4850. I wish to know whether it does not come to this, that every point which you establish in the town, where appliances are kept which can be easily used for the purpose of putting water upon a fire, is an additional security?—Quite so.

4851. And, as a matter of fact, really prevents the necessity which seems to have been shown of increasing the actual number of fire stations in many parts of the town?—Yes, I daresay it would have that effect.

4852. And supposing a system to be established by which the police standpoints (of which Captain Harris gave instances, there being a very large number spread through the town) were utilised as stations, where fire appliances could be fixed, they would be useful not only for the constantly-charged mains, but for the intermittently-supply pipes, by leaving there, under the charge of the policeman, buckets and hand-pumps, and things of that sort, which could be brought to bear instantly before the brigade could move from the fire-brigade station?—Yes; there would be no objection to supplying them with certain fire appliances for immediate use.

4853. And many of the fires might, I suppose you would say, from your practical knowledge, be rendered far less severe if water could be brought to bear

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bear immediately upon them, instead of waiting until the engine arrives?—Yes; I have no hesitation in saying that every addition to the force, whilst not weakening the force, adds materially to its use.

4854. And you would add materially to the security of the town by giving those additional points, with facilities for extinguishing fire attached to them?—I have no doubt upon that point.

4855. Giving, also, greater facility of communication, which could be secured by telegraphic connection between such points?—Quite so.

4856. I asked you a question with respect to the possibility of this system doing away with the necessity of increasing the number of district stations throughout the town, but I suppose, also, the number of additional assistants that you would get in this way, by utilising the policemen at the fixed points, who might, through you, be instructed in the use of those small appliances, would add materially to the working power of your force, so as to do away with some of the hard work which has been complained of on the part of the men?—Yes, I presume it would do so.

4857. Now, with regard to to this question which has been referred to the Committee, of the danger which exists at present in theatres; I suppose you have not yourself gone very fully into the question?—I have gone very fully into the question, in one sense. I have been a fireman for a great many years, and I have had to look into all the risks of a great many different trades and buildings in many cities, and, amongst others, I have looked into that question; but I have no special power of inspecting theatres. I have never inspected theatres in this town officially, and, therefore, I am not able to give to the Committee specific information about individual theatres; but if the Committee wish to ask me any questions upon general principles I think I can answer them.

4858. With regard to theatres, speaking generally, I presume that one of the principal points you would suggest as a means of security would be a division of a theatre into two parts by sufficiently fire-proof appliances; that is to say, the separation of the auditorium, as far as possible, from the stage and the dressing-rooms and other places?—That is a most important point; but long before you come to that point there are others; there is the strength of the fabric, the strength of the walls, and the strength of the internal partitions.

4859. With regard to that, I was going to ask you whether that is not already provided for by the Metropolitan Building Act?—I am not aware that it is.

4860. I understand that the Metropolitan Building Act gives to the district surveyor the power of inspecting those buildings on their erection, and a power to object to any structure which is not sufficiently strong for the purpose for which it is intended to be applied?—I am not able to answer on that point.

4861. Ought not that to be a part of the system by which the erection of buildings is regulated in the metropolis?—I think so, certainly; perhaps it is so. But there are many buildings in the metropolis which are exempt from the Building Act, such as, for instance, the Dock Companies' property, railway stations, and so on.

4862. Are they?—Yes, as far as I am aware.

4863. Theatres are not exempt from the operations of the Act?—I have understood that there was another authority for theatres, but I am not able to answer the question.

4864. I think you may take it that in any erection of a new theatre, the Building Act would apply for the purpose of protecting the public, as to the actual structure; but, without going into those particulars, that which may be necessary for the special building, such as the particular number of entrances and exits, and the size of the passages, or of the particular material of which they ought to be constructed may probably not be contemplated; but the mere building of the theatre, I fancy, would come under that Act?—Probably; but as regards old buildings adapted for the purpose, I think there should be an authority in that case also; perhaps there is, but I am not aware of it.

4865. The construction or alteration in any way subsequent to that Act would bring in the district surveyor; but supposing that to be the case with regard to a new theatre being built, are there any points which you can suggest to the Committee which would regulate the way in which it should be built?—Yes, there are a great many points which I would suggest. I think, in the first instance, complete arrangements ought to be made for the immediate safety of every portion of the audience.

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4866. You would separate the auditorium in separate portions, each having a separate entrance and exit?—Yes, I would do that; I would also have a second exit for each portion of the audience, one at each side of the building.

4867. And you would make a double staircase; in fact, a staircase for each portion of the audience?—I would make two staircases from each portion, and I would also provide immediate retiring places for the audience from every part of the theatre, not for the whole audience, but for a considerable portion of it.

4868. You mean by that that the passages leading from the auditorium should in themselves be able to contain that portion of the audience?—I mean that they should be able to contain a portion of the audience in that part. I do not think it is necessary to have room for the whole audience, though in a very recent case a law has been passed to that effect.

4869. Is that with respect to the Criterion?—No, it is not in this country.

4870. Can you tell the Committee where that has arisen?—No, I am not able to point that out at this moment, but I have the authority at home.

4871. Are you aware that the Criterion Theatre in London has been built with the view to carry out that principle, and that the passages from it can contain the audience?—I am not aware of that. I think it is a most important arrangement to be made in any theatre, and I think there should be a very distinct certificate that it is so. I am not aware that such space is provided in any theatre in London.

4872. You think that ought to form part of the requirements before a certificate for the theatre was given on which the license of the Lord Chamberlain should issue?—Yes, I do.

4873. Taking that as one of the requirements, would you consider that it would be necessary that those passages should be so constructed as to be in themselves absolutely fireproof?—I should say they ought to be heatproof. I do not think it is of the slightest consequence whether they are ultimately destroyed or not. I would make all such parts proof against any effects of heat for 10 or 15 minutes.

4874. In fact, as long as you find the means of getting the audience quickly out of the place that is all you would require?—That is all; I would not interfere with the theatre beyond that point.

4875. I suppose, in order to secure that, the passages and the landing place ought invariably to be built of strong masonry of some kind?—Yes, or of massive wood.

4876. I suppose the word "fireproof" is of very large meaning, and very difficult to determine, is it not?—There is really nothing that is proof against fire; it is a mistaken term altogether; it is very commonly used, but it has no definite meaning in its common use.

4877. One of the articles which is mentioned in the Building Act, namely, stone, is one of those whose properties are as little fireproof as almost anything in the construction, is it not?—Yes, it is not proof against heat.

4878. For this purpose, that is the object which you have in view?—Yes.

4879. Under those circumstances, I suppose you would recommend that stone should not be used for staircases?—I think that stone unsupported is very dangerous for staircases.

4880. Then stone supported, supposing that it is supported by several of those materials which are recognised at present, such as iron, you would not consider as fireproof?—It certainly is not fireproof.

4881. The tendency would be for the iron to bend and bring down or pull down the stone staircase?—Yes; the iron would either bend or crack, and the staircase would fall down upon the application of heat.

4882. The great heat would naturally probably melt the iron?—It would fracture or bend the iron, as the case might be, according to whether it is cast iron or wrought iron.

4883. From your experience, do you find that stone staircases are practically insecure?—Yes, I do.

4884. And that they are not to be trusted in the least?—I think that they ought not to be trusted in the least, after heat has been applied to them.

4885. And that if put up, they should be solidly protected by brickwork underneath?—Yes, or supported by wood, or some other material proof against heat.

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4886. Wood, if properly chosen, is quite as available as any other material for the purpose of resisting fire for a given time, is it not?—Wood will not yield to the effects of heat at all, unless accompanied by actual flame. It will, of course, yield in time to flame, but very slowly.

4887. But as you have stated that the object was only to preserve those passages and staircases for a certain time, so as to allow the exit of the audience by them, wood would be a proper material to use for the support of those staircases?—Yes, I think massive wood would be a very good material to use.

4888. Is there any regulation you would suggest as to the space to be allowed for the audience in those places according to the number that the theatre contained?—I should say that the sitting space should always be made in proportion to the number which you were to seat, and that a rule having been adopted allotting the space, no more persons should be allowed there, and that outside in the passages I should allow room for a proportion of that number of persons.

4889. The great difficulty of course which has to be contended with is not so much the absolute fire as the panic which arises, and the pressure which takes place in those passages?—Quite so.

4890. How would you propose to obviate that?—By making the passages sufficiently large for the persons who have to go through them, and separated from the place in which the greatest danger lies.

4891. And avoiding pressure by ensuring that they shall always open outwards?—Yes, and also that there shall not be too many persons in any one straight passage.

4892. Would you divide the passages then by barriers so as to prevent too great a direct pressure?—I would either divide the passages by barriers, or I would make the passages themselves zigzag, which may in certain cases save space. You make take it as a general rule in dealing with a crowd, that a crowd will not push round a corner, if that term is understood; that is to say, if you can divide the people into a certain number of passages where there would be a bend at the end of every 50 or 100 persons, then the pressure on any person within one of those limits, is only the pressure of that number of persons, and not of the whole number who may be within the building.

4893. So that by varying the lines of your passages you might reduce that danger without the use of barriers?—You reduce the danger of crushing.

4894. With regard to the number of exits, do you think they ought to be prescribed in proportion to the number of people the building may contain?—I do.

4895. That is done on the Continent, is it not?—It is done in many places.

4896. You would not allow any license to issue unless the proprietors had complied with some regulations of that kind?—I would not.

4897. I suppose, with regard to the stage, the greatest danger lies there?—Yes, on the stage and the parts surrounding the stage.

4898. Would you think it requisite to lay a requisition that that part should be divided by brickwork from the auditorium?—Yes, I think that the main wall should be of sound masonry throughout; stone would be equally good as brickwork for that purpose, because in that case it would be supported, and then there should be double iron doors at the sides of the great opening, and some partly fireproof curtain over the great opening; something, in fact, to keep back the flame from the audience during the 10 or 15 minutes that may lapse while they are passing out of the house.

4899. I believe they have adopted the wire-gauze curtain on the Continent?—I believe whenever a curtain has been adopted, they have had an inferior article; they have not had the proper thing for it.

4900. I think the evidence which the Committee have had from other witnesses has rather thrown doubt upon the utility of a curtain on the grounds, firstly, that it would not intercept the fire; and, secondly, that it would create just the same panic when it was lowered, to prevent the audience seeing the flame, as if they did see it?—I can see no meaning in those objections. I believe there can be no doubt that it would do a great deal of good; it would, at all events, have the effect of stopping the great bulk of the smoke from passing over instantaneously into the audience part of the theatre, as it does now.

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4901. You suggest that it would be advisable to have a curtain for the sake of delaying the fire from reaching to the auditorium?—Yes.

4902. Do not you think that its being lowered would create the very panic which people dread?—I do not think it would create anything like the panic that a volume of smoke would passing over the top of the house under the chandelier, and on to the gallery, as it does now.

4903. I suppose at the back of the stage great danger exists in the way of dressing rooms and carpenters' rooms, all of which ought to be made fireproof?—I think they should be made fireproof for those who dress in them.

4904. With regard to the curtain, are you able to say whether there is such an invention at present as what you consider a proper fireproof curtain?—I have no doubt whatever that any of these metal curtain makers would undertake to make one if they got a proper price for it. I have the authority of many engineers, who are personal friends of my own, that there is not the slighest doubt that such a curtain could be made.

4905. But it does not form a part of any theatre abroad where a curtain does exist?—Not of any theatre that I am acquainted with.

4906. I suppose you might have the curtain so constructed that they could use it permanently as the curtain between the performances?—I have no doubt that it could be so arranged, but I think it would be very expensive; it would be putting on managers an expense which they would be hardly able to bear.

4907. The advantages of it would be that the public would be accustomed to it?—But the falling of even the present curtain, which is an inflammable article, might save considerable panic in a theatre by stopping the smoke.

4908. We have had some evidence with reference to the possibility of making scenery fireproof by the application of chemicals; if the curtain could be made so far fireproof as to be able to resist for a time the burst of flame, that would be a very valuable addition to the safety of the audience, would it not?—Certainly it would be a very valuable addition to the safety of the audience. I think, moreover, there should be a large opening made over the stage for letting off the smoke. If we look at the experience of this last fire at Brooklyn, which has called attention to the subject, we find that, exactly as we expected, the smoke passed over from the stage to the upper rows of the gallery, in a space of time which is estimated by various persons at from half a minute to two minutes; I do not think that anybody makes it more than two minutes.

4909. And you would suggest that there should be a counter outlet on the side of the stage itself?—I think if there had been a large opening, 20 feet square, over the stage part of the theatre, and the curtain had been dropped, it is quite possible that every individual would have escaped unhurt from the house, but the moment the smoke passed over, a panic commenced, and then there was reasonable ground for panic.

4910. Do you think there would be any difficulty in so ventilating a theatre?—Not at all. I see none; it would involve having the part over the stage a little higher than the rest of the house, but the action of it would be absolutely certain.

4911. You would I suppose make that one of the conditions in the building requirements of any theatre in the future?—I would.

4912. Sir *Henry Peek.*] With reference to Question No. 2465, where Mr. Hollingshead states that from his experience, and from the experience of the working of it in America, an iron curtain is practically useless, from its buckling up and getting out of order, when it is called upon to work; do you yourself think that that would be an objection?—Not at all. I do not think there would be any objection of the kind. I think that even so the heat taken up by the buckling would have been a great element of security for the audience.

4913. *Chairman.*] And that buckling up would not take place practically until the curtain had done its work in separating the fire and smoke from the auditorium?—Precisely; the audience would have had time to escape in the interval. In all the evidence which I have given about this matter, I assume from the commencement that it is of no consequence to anyone except the owner whether the theatre is destroyed or not, the object being to save life.

4914. Then to protect as far as possible the audience from fire, I suppose that all such things as we have heard of as constantly existing at present, namely, carpenters'

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carpenters' shops and workshops over the ceiling, and over the gas chandelier, and so on, should be forbidden in future?—I think they should certainly be forbidden.

4915. They are a source of danger at the present moment?—They are a source of extreme danger at the present moment.

4916. With regard to the water supply, I suppose you think that in all theatres that should be carried out on some given principle?—Yes, I do.

4917. And that hydrants with constant pressure, instead of being occasional, should be universal?—Yes, I think there ought to be hydrants in every portion of a theatre.

4918. Do you think that the system which is established in Paris of having a man belonging to the fire brigade, a *sapeur pompier*, attached to each theatre for the purpose of fire, would be a good one, or that the system which has been described here of the staff under the manager, is a better one?—I think that theoretically having the men of the public fire brigade is the better plan, but I do not think it would be suitable to this country, as it would certainly cause what I have always objected to, namely, division of authority. I think that a manager should be solely responsible for everything that happens in his house.

4919. It has been suggested, that if a man trained in the fire brigade were attached to each of those theatres, though for a time it might work, yet that a clashing of the different authorities would arise, and he would not consider himself so much a servant of the manager, and would not have his interest at heart, and, therefore, ultimately it would not be so much to the interest of the public as if he were the servant of the manager himself?—Quite so.

4920. You would, therefore, throw the responsibility upon the manager himself, whilst making him fit up his theatre with all the proper appliances?—Yes, I would.

4921. Are there any other points which you would suggest with regard to the rules which should be followed out in the erection of theatres?—There are a great many points, but I think they are too numerous to be followed in detail. I once wrote a pamphlet upon the subject, which hardly exhausts the question, and I have been in communication with a gentleman abroad, Mr. Fölsch, of Hamburg, who has been working in the same direction as myself, and we both come to the same conclusion, but that evidence is much too lengthy to be given here.

4922. It comes to this, that you think that some authority should have control over the erection and buildings of existing theatres so as to bring them into the condition which you would describe as secure?—I think so.

4923. And that any such authority should study certain fixed rules which should apply to all theatres?—Precisely.

4924. And that unless they were so altered or so built, they should not be able to get a license?—Precisely.

4925. Is there anything else upon the whole of the evidence which you would like to put before the Committee in your examination in chief?—There is nothing else that I remember.

4926. Mr. *Ritchie.*] I think, putting aside the question of police, you stated before the Committee, that under the existing state of things you thought that London to be efficiently protected, would require a force of 931 men?—Yes.

4927. I think you estimated the cost of that to be about 120,000 *l.* a year?—Yes.

4928. Or about 50,000 *l.* more than you pay now?—It would be 40,000 *l.* more than the brigade cost now, I believe our expenses now are 80,000 *l.*

4929. Now I understand you, from the answers you have given to the honourable Chairman, to intimate that if you had this amalgamation, or semi-amalgamation with the police, such as he has indicated, you would not require an additional staff to your existing staff?—No, I do not suppose we should, but then an addition would be required in some other direction.

4930. Do you mean to the police?—I presume an addition would be required for the police.

4931. We have it on page 674, in a report signed by the Chairman of the Metropolitan Board of Works, and by Mr. Richardson, that the hydranting of the metropolis would, in their estimate, cost 300,000 *l.*, which at 4 per cent. would be equivalent to 12,000 *l.* a year; now I suppose, if you had the assistance

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of the police in such a manner as has been indicated, and had London all hydranted, it would be better or fully as well protected as it would, even by the number of men you originally spoke of, namely, 931?—Yes, but that assumes so much; it assumes that we should have free assistance from the police, and also should have power to instruct a large number of the police.

4932. I am assuming that; assuming for the sake of argument that there was a general amalgamation, though there was a separate department for the fire brigade, I understand you to say that you would not then require an addition to your present force, and if you had London all hydranted in the way suggested by that report, the protection to London would be better than if you had your 931 men, whom you stated you would otherwise require?—Yes, on that assumption it would be so.

4933. Assuming, then, that to bring up your men to the number you require, it would cost between 40,000 *l.* and 50,000 *l.* more to the ratepayers, and assuming that London was hydranted at a cost of 12,000 *l.* a year, as reported by the honourable Chairman of the Board himself, London would be more efficiently protected, and there would be a saving of about 30,000 *l.* a year upon your estimate; is not that so?—Yes, I suppose that is so.

4934. I suppose you can see how it is arrived at; if the cost of the additional sized brigade you spoke of were to be between 40,000 *l.* and 50,000 *l.* a year, and the cost of hydranting were only 12,000 *l.* a year, of course you effect a saving of about 30,000 *l.* a year?—Quite so, in that way.

4935. Will you have the goodness to refer to questions and answers beginning at No. 3894 in the evidence given by Mr. Freeman. I do not propose to go into all of them specially, but they indicate generally, do they not, that the evidence which you gave on the question of the overwork of the men was, to say the least of it, considerably exaggerated, and that a great deal of the overwork which the men complained of was to be attributed to what was considered evidently, by the witness, as very unnecessary discipline upon your part. I suppose that the opinions which you expressed to the Committee previously are your opinions still, and that you have not been influenced by what has been given in evidence in these questions and answers?—No, my opinions have not been altered at all by those questions and answers.

4936. Do you consider that the discipline which you insist upon is an unnecessarily stringent discipline?—I do not, or I should not insist upon it.

4937. Do you consider that it might be relaxed?—No, I do not.

4938. Do you consider that the complaints of overwork that were made by the men were justifiable ones?—Yes, I know that they were justifiable at the time.

4939. Will you now kindly refer to Question 4230 in the evidence given last year; the question is, "On the whole do you think that the brigade, as manned at the present time, is worked harder than any other body of public servants; take the police, for example;" and the answer by Mr. Freeman is, "If you ask me whether I would rather be a policeman to take his duties, or a fire-brigade man to take his duties, without an atom of doubt I would infinitely prefer the service of the fire brigade to the police. A fire-brigade man has ample time to read his newspaper and smoke his pipe, and make himself comfortable, and we are delighted that he should do so, and would give him more if we could;" is your opinion in accordance with the answer given there?—No, it is not.

4940. Quite the contrary, I presume?—Quite the contrary.

4941. Let me now refer you to No. 4087; the general tone of that answer, and of the answers following is, that your men are really not much inconvenienced by having to sleep in their clothes, and that they can get as good rest sleeping in their clothes, and having to attend to the telegraph wire, as if they had not got their clothes on, the inference being that they are not after all so hard worked, because they are able to get that rest which Mr. Freeman evidently thinks is sufficient rest; is that in accordance with your experience?—No; there is certainly something trying to a man to have to sleep in his clothes. It makes a very great difference whether you have them on or not.

4942. Altogether, you have nothing to withdraw of the evidence that you gave with reference to the hard work that the men are subject to?—Not at all; they were very hard worked at that time.

4943. Mr. *Onslow.*] Are you aware that most of the sailors in Her Majesty's Navy

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Navy have a previous training in training ships before they become able-bodied seamen; that is to say, training as regards climbing, and everything connected with going up aloft?—Yes, I am.

4944. And also, that at the present there are very few of the old class of clippers which there used to be in former years, most of our commerce now being carried on on board steamers, and therefore I presume that class of sailors, such as you describe, is getting fewer and fewer?—I have no doubt it is.

4945. And do not you think, therefore, that considering the training these men have before they enter the Navy, men from Her Majesty's ships would be just as good for your purpose as the Merchant Service of the present day?—Certainly they would theoretically, because they are very fine men, and their training is of very great service to them; but if a man has been six or seven years out of a sailing ship he is not so useful for our purpose as a man who has spent his time in a sailing ship. Practically I like men from the Navy, better than from the Merchant Service, if I can get men who have been accustomed to climbing; but the blue jackets are not now much accustomed to climbing, whereas there is a large class of shipping, the Australian, the New Zealand, and the China clippers, which supply us with the best climbing men in the world.

4946. Therefore, practically you do not take your men from the sea unless they have been in sailing ships?—Of course we are obliged to take them as we get them, but, as a rule, we do not take them unless they have been in sailing vessels. The Merchant Service still supplies a large number of climbers; the Navy supplies only a small proportion of very good climbers, which makes a most important difference to us.

4947. You say, "as a rule"; if you would in any cases break through the rule, would you not break through the rule in the cases of sailors in Her Majesty's Navy?—I do so whenever it is possible.

4948. We have had evidence that very high houses are being built along the banks of the river and in other parts of London, and we have also had it in evidence that your steam engines could not cope with the fire if it broke out in the top storey or storeys of such a house; will you tell the Committee if such is the case or not?—My answer in general terms to that would be, that our machinery is now strong enough for the purposes that we require it for.

4949. To reach to the height of 100 feet?—Yes, to reach to the height of 100 feet; but it is not the practice to work a jet 100 feet from the ground level. If we cannot climb up into the building the efficiency of the jet at that height is very small indeed with any machinery whatever; either ours or any other.

4950. Take Queen Anne's Mansions; do you think that your steamers could throw a jet of water to the top of Queen Anne's Mansions?—I am of opinion that that building would be entirely destroyed if it depended upon a jet being thrown from the ground level to the top storeys. If we could get up into the building, our steam engines are quite strong enough to throw a jet from those parts to which we could reach.

4951. In answer to Question 333, Colonel Fraser says, "In a large fire which occurred not very long ago at a wharf near St. Paul's, the fire engines could only send the water up to the fifth storey, whereas this was a building of seven storeys"; do you recollect that case?—I presume that was the fire at Brook's Wharf, but I certainly cannot say that the engines were too weak on that occasion; but there was a wind blowing, and no doubt the jets would be scattered.

4952. But you would consider it a serious thing if, practically, there was no protection for the tops of those houses which are building at the present time?—I think it is a serious thing, but I think it is a serious thing for the builders of those houses. It is a difficulty which they must themselves face in some way or other. If they make such arrangements as to enable us to approach any part of their houses we can reach to the top, but if they are completely shut away from help, I see nothing that we or any other fire brigade could do, either by our present arrangements or any other arrangements; in other words, you cannot throw water a great distance through the atmosphere with any certainty so as to extinguish a fire.

4953. Do you know whether the insurance on such houses as are now being built to that extreme height is greater on account of the greater risks from fire, owing

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owing to the greater difficulty of putting out such a fire if it arose at the top of the house?—I cannot say that. I know the risk is greater, but whether the insurance offices charge more for it, I cannot say.

4954. Have you ever made any experiments as to the loss of force in water by friction through hose?—Yes, I have.

4955. Could you give the Committee the results of your experiments?—I did not expect to be asked that question. I am afraid I could not give the results. There is a loss by friction with every length of hose that is added.

4956. Talking about this point, Mr. Bramwell says, in answer to Question 5823, "Then I say that the reason why it would not be expedient to expend money in hydrants upon such a pressure as that is as follows, that you do not in practice, even on a calm day, get more than about five-eighths of the height of the head as a jet of solid water"; that is through a hydrant; now, can you tell the Committee to what height on a calm day, by working your steamers, you could send a jet of water?—Yes; on a calm day, with our ordinary smallest size steam fire-engine, I think we could send the water to the height of about 120 feet from the ground level, and by coupling those engines together we can do considerably more; but I see no object in doing such a thing, and we never do it.

4957. But for the protection of those high houses which are being built, you would require very often to throw a jet of water 120 feet, would you not?—But as I have explained to the Committee, a jet of water thrown 120 feet is of no avail for our purposes; the water would be scattered at that distance. What we want to do is to be able to get near our work.

4958. Have you ever ascertained the time, when a theatre is crowded, that it takes the audience to leave the theatre?—As a matter of fact, I am acquainted with the time which they take, but, as I have explained to the Committee before, I have no official power in this matter in London; none whatever.

4959. But I am asking you as one who has given up a great deal of his time to the subject?—I know the time it takes to clear many theatres.

4960. We have had it in evidence that many theatres are cleared in five or six minutes from the time the curtain drops, and in one case, namely, the Criterion, it is stated it was cleared in two minutes; is that your experience?—No; it is not.

4961. Take any ordinary theatre, such as the Lyceum, supposing a full night, how long do you think it would take to clear that theatre under ordinary circumstances?—Under ordinary circumstances it takes about 12 minutes at the greatest to three minutes at the least.

4962. *Chairman.*] That would depend very much upon the question whether it was a wet night or not, and whether people had to wait very much for their carriages?—Possibly it does so.

4963. Mr. *Onslow.*] Do you think it practicable for any theatre on a full night to be cleared in three minutes?—No, I do not. Not any theatre in London.

4964. Would not the plan which you propose of having such a number of exits be almost impracticable at the present time, on account of the difficulty which the proprietors of the theatres would have to undergo by reason of the want of space?—I have no doubt that at the present time London, with regard to its theatres, is in a very great difficulty, and, of course, it would be impossible for some of the managers without great expense to make such arrangements as would make their audiences safe now. That I am quite aware of; but it was not impossible when these theatres were first built, nor is it impossible now, if the expense is incurred; but in many of these theatres they allow seats to be placed up to the outer walls, and there is the mistake. They should allow in every theatre a space between the outer walls and the inner walls, and that space should be occupied in the case of a panic by the audience of the theatre, or a large portion of the audience.

4965. At all events, to carry out your suggestions in these old theatres, the expense would be very great indeed?—I have no doubt it would.

4966. And in some cases it would be almost impossible, on account of the want of space?—No; in almost every case where you have no space for doing it outside, I would reduce the space occupied by the audience of the theatre by making internal walls.

4967. Practically

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4967. Practically altering the whole construction of the theatre?—In many cases, no doubt, it would be necessarily so, if the audience is to be made safe.

4968. Are you aware at present, as we have it in evidence, that there is no inspection of music-halls in London?—Yes; I heard that that was given in evidence.

4969. I presume you think that that state of things should be altered, and that music-halls should be thoroughly investigated as well as theatres?—I do; but if I were asked to give a definition of a music-hall, I think they have reached such a point that I should be unable as a practical man to give it; I do not know the difference between a music-hall and a theatre.

4970. And you would recommend, as you have done for theatres, that there should be a hydrant or hydrants in every music-hall?—I would recommend that there should be a system of hydrants in every music-hall.

4971. There are very few theatres, I believe, in which fire-brigade men are continually employed?—There are none in which men belonging to the fire brigade are employed, but there are several in which men who in past times have belonged to the fire brigade, and who did receive a proper training, are now doing duty as firemen for the managers.

4972. Do you think that on the whole that is the best system which could be adopted?—Yes, I think so, in London.

4973. Would you make it compulsory on theatrical managers to have somebody well experienced in fire matters constantly attached to the theatre, night and day?—Quite so, and responsible for the working of this department; that is a most important point. If he is not made responsible in that way, his presence is only a trap for everyone concerned.

4974. What authority should inspect the working, do you think?—The manager, and no one else.

4975. And you, as manager of the fire brigade, should have nothing whatever to say to it?—Nothing whatever, otherwise I do not think the system would work.

4976. Sir *Henry Peek.*] You have carefully considered the evidence which you gave here last year?—I have.

4977. Is there any material point in which you would desire to alter it?—No, there is no material point which occurs to me.

4978. A little while ago you stated that in putting out the fire at Her Majesty's Theatre, and also at the Oxford Music-hall, you had the water from two companies; was that because one company could not supply you with water enough, or how was it?—No, that was not the reason; it was because the two companies had their point of junction near the scene of the fire.

4979. You stated that your floating engines could throw a jet of water 120 feet high?—They can.

4980. They did not do so at the fire at Brooks's Wharf?—The floating engines are capable of doing it, but no engines can throw water 120 feet through the atmosphere when the wind is blowing.

4981. Brooks's Wharf is upon the river, and therefore you had to depend upon your floating engines; were you satisfied that your floats did the duty they ought to have done at that fire?—Yes, I was, but we were not depending solely upon the river at that fire. And again, those jets which were thrown from the waterside and which may have been seen by the public to break before they reached the fire, were not the jets which extinguished the fire; those which extinguished the fire were those delivered from the land side which were brought within the building.

4982. I passed while it was going on, and it appeared to me that two storeys of the building were wholly above the means you had of putting water on to those floors?—Wholly above the means which we had of throwing the water from the river side to them, but not above the means which we had of getting water thrown on to them from the land side from the positions which we took.

4983. But Brooks's Wharf is not 120 feet high; how is it that the two jets from the floats did not reach the top storey?—Because the wind broke the jets.

4984. You say that since you gave evidence before the Committee last year a scheme has been accepted by the men; there are two ways of accepting a thing;

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accepting it cheerfully or otherwise; do you think that they accepted it in a spirit showing you that it met really the equity of the case?—At the time of the men accepting this scheme there were considerable differences of opinion amongst them, but finally it was decided that they would express their gratitude to the Board for having passed the scheme, and they would take their chance of the Board altering at some future time. That scheme as a whole is satisfactory, but there are some details which the men hope at some future time the Board will reconsider.

4985. Are those details really minor details?—No, they are not minor details, they are important details, but they are not of such a character as to call for the rejection of the scheme on the part of the men.

4986. On the principle that half a loaf is better than no bread?—It is a great deal more than half a loaf. The scheme is almost entirely satisfactory, but there are some points which I have no doubt will be adjusted in a manner entirely satisfactory to both parties.

4987. Supposing London, as the honourable Member for the Tower Hamlets has stated, were fully hydranted, would that do away with the necessity for engines?—I do not think it would do away with the necessity for the large engines, but it would do away with the necessity for an increase of them.

4988. Do you think your present staff would be too great, or would you require to keep up your present staff?—I do not think we should fall below our present staff of engines, which is very small.

4989. Notwithstanding that the town were thoroughly hydranted?—I think the effect of the town being thoroughly supplied with hydrants would rather be to reduce the number of hours which each engine on the establishment would be at work, than to reduce the actual number of engines. I do not think we should be safe in doing away with a large portion of the force.

4990. *Chairman.*] The tendency would rather be to increase the number of manual engines, because you might wish to place one at each of the police stations to be taken out by the reserves if the system were carried out, which the honourable Member for the Tower Hamlets was referring to?—Quite so.

4991. Sir *Henry Peek.*] Sitting here nothing has more surprised me than the various evidence which we have had upon the subject of the cost of hydrants. I dare say you have very carefully considered the whole of the evidence; what is your idea of the cost of hydrants. We have had them stated at from 4 *l.* or 5 *l.* to 25 *l.* apiece?—That is a question I am not very competent to answer. I have heard of it, but I have nothing to do with the commercial part of such a transaction. It has been given in evidence that I am the possessor of a patent, but, as I have explained, that is an entire mistake.

4992. But here is a drawing of your own, and therefore, though you would not be pecuniarily interested in it you would have gone into the cost very carefully?—I believe these hydrants cannot be put down under 10 *l.* apiece.

4993. Do you think that 10 *l.* should cover the cost of putting down effective hydrants for general purposes?—I have heard that it can be done for less, and therefore I should recommend that it should be done for less.

4994. But the City of London is going to an expense of more than double that sum?—The City of London is putting down my hydrants, and I have no doubt that for such a hydrant, which I now hear is an expensive hydrant, and the breaking up of the road and replacing it, the total cost is very heavy.

4995. Mr. *Stewart Hardy.*] Could you tell the Committee what those details are in the superannuation scheme that the men are not quite satisfied with?—The principal point is the age at which a man has power to retire; in fact that is the only point upon which any serious difference of opinion arises.

4996. And with regard, of course, to the cost of these hydrants, it depends entirely upon the material of the road and the distance the pipe lies in the centre of the road?—Of course that has a great deal to do with it, but not everything; the cost of the hydrant itself must also come in. I think if an effective hydrant can be got for 2 *l.* or 3 *l.* in large numbers, I should recommend it in preference to the hydrant I invented myself, which I consider the better hydrant.

4997. Sir *James M'Garel-Hogg.*] With regard to the representation of the men

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men as to their being overworked, as represented to the Committee last Session, has any relief been given to the firemen in that respect?—Yes, I have been authorised to employ assistants in the place of all men sick, and all men under instruction, which has given considerable relief to the men.

4998. Is that a sufficient relief?—It is not a sufficient relief, but it has been a very large amount of relief.

4999. And has been a great satisfaction to you yourself and to the men?—It has.

5000. With regard to the question of pension, is it not the case that in two respects, at all events, the pension scale adopted by the Metropolitan Board of Works is more liberal than that of the police; is it not the fact that the police have a larger deduction made from their pay than is made under the Metropolitan Board scheme; I think the police are subject to a deduction of 2½ per cent., but in the Metropolitan Fire Brigade of only 2 per cent?—I am afraid I am unable to answer the question. I can say that the deduction is satisfactory, but as a matter of comparison I am unable to answer the question.

5001. The only point upon which the men were not quite satisfied was this, that they wanted to have an earlier age for retirement than 55, and, I believe, a shorter service than 30 years; was not that it?—I think they are satisfied, more or less, with the 30 years' service. They are dissatisfied with the limit of age of 55 years.

5002. That is the only point of difference in any shape, is it not?—At present I think that is the only point. I have no doubt that eventually there will be some representation made about the 30 years' service, but at present that does not arise, and the only point is the 55 years' limit.

5003. With regard to the new station at Southwark Bridge, you have seen the plans of the buildings as they are arranged; do you consider the arrangement a good one?—In every respect.

5004. Do you think that the accommodation provided is all sufficient for the requirements of the fire brigade?—I think it sufficient in every respect.

5005. Now with respect to some question which the honourable Member for the Tower Hamlets put to you: what did you understand him to mean when he asked you a question about the amalgamation or semi-amalgamation with the police; did he mean extra assistance to be afforded by the police, or did you understand him to mean the transfer of the fire brigade from the Metropolitan Board of Works to the police?—He asked me no question whatever about the transfer.

5006. I only wanted to ascertain whether you understood his question?—I understood the honourable Member to ask me whether we could receive considerable assistance from the police, and I answered that we could.

5007. It was merely with regard to extra assistance from the police to the brigade as now constituted, and you gave your answer on that basis?—I did.

5008. And you agreed to there being several appliances at certain fixed points?—Yes.

5009. Which you thought would be of assistance to the fire brigade as now constituted?—Yes.

5010. And you gave your answer on that understanding?—The question that was put to me was the actual question as you now state it, and there was no misunderstanding about it; he also asked me about the telegraphs, which I answered in the same spirit.

5011. Then with regard to the question put to you about the Report signed by myself and Mr. Richardson; was not there in that Report a distinct statement that we contemplated constant supply and high pressure throughout London; do you think that it would be of any use to put down hydrants all over London, where there is not constant service and high pressure?—Certainly, it would be a great deal of use. The reason I have not recommended it before is, that I was requested to take into consideration the question of expense.

5012. Do you think that the question of expense ought to form a consideration?—Of course it must form a most important consideration.

5013. Have you read the evidence given by Colonel Henderson and Colonel Fraser?—Yes.

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5014. Do you agree with them that it would be no appreciable benefit to amalgamate the police and the fire brigade. Colonel Fraser says, "So far as the City of London is concerned, I do not think it would appreciably increase the strength of the fire brigade at all, to incorporate them with the police?—I agree with that answer.

5015. Now I would ask you to refer to last year's evidence, at page 573, at No. 7737 of Colonel Henderson's evidence, will you tell me whether you generally agree with Colonel Henderson's views upon that subject?—Yes, except with regard to the last two lines. I think that the police could be very easily drilled to do such work as might be required of them; it would be only to assist.

5016. But not to assist in the preservation of life with ladders, and so on?—I think they might do anything that was to be done on the ground level.

5017. You think they might be drilled to assist the fire brigade in doing a trifle more than they do at present?—I think so.

5018. Mr. *Hayter.*] I understood you to allude to, although you did not detail, the difficulties which would have to be met in the amalgamation of the fire brigade with the police; would you tell me what those difficulties are in detail?—The police duties have hitherto run in a totally different direction, and if the responsibility were thrown upon the police, everybody must be trained to the new work, and, of course, there would be considerable difficulty in that, although it would not be impossible.

5019. Is that the only difficulty?—That is the only one.

5020. You see no difficulty with regard to organisation?—Not specially.

5021. If you gave the police additional duties with respect to fires, you would, I presume, have to add to their pay, and make them a certain allowance for their clothes, which is not made now?—Yes, I suppose you would have to do so.

5022. In your reply to the question of the honourable Member for the Tower Hamlets, you did not take into your calculation the pay to the men and the allowance for clothes?—No, I did not. Of course, there would be some allowance made to the men.

5023. Have you proposed any amalgamation of the salvage corps with the fire brigade?—I have not proposed it.

5024. Do you think that the salvage corps, in its action at fires, is in any way influenced by the knowledge of property being insured, or otherwise?—I am unable to answer the question. I have no doubt that it is to some extent, but not very much so.

5025. They are employed and paid by the insurance companies, are they not?—Yes, they are.

5026. Do you see any practical difficulty in their being associated with the fire brigade under the charge of the officer in command of the fire brigade at fires?—No. If the fire brigade originally had established a salvage corps, I see no difficulty whatever in it. I think that it should be under one government, but I think that, practically, you would find that there would be a good many other difficulties, and perhaps greater difficulties in London than in any other large city.

5027. Tell us what difficulty there would be?—The difficulty of realising the damaged property, and turning it into money at the end, and the distribution afterwards of that money, would cause very great difficulty.

5028. Then, if a person's property is saved who is not insured, he cannot be called upon to pay for the property saved, can he?—No, he cannot at present.

5029. Practically, do they take any orders from the officer in command of the fire brigade at a fire?—Certainly, they would do so. The officer in charge of a fire brigade has entire command of everything during a fire by Act of Parliament, and if he choose to give any orders to the salvage corps, they would certainly be obeyed; but it is very rarely necessary to give any orders, because most of the men in the salvage corps have been brought up in the brigade, and know, of course, the ways of the service, and it is very rarely necessary to give an order. When anything is required to be conveyed, it is generally more in the way of a request than of an order.

5030. With regard to the superannuation scheme, you said in answer to Question 1402 last year, that without fixing the limit of age, a man should be entitled

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entitled to discharge after 30 years' service; does this superannuation scheme provide for his receiving a pension after 30 years' service?—No; he must have attained the age of 55 years.

5031. In your opinion you have a distinct preference for a number of years' service?—I have.

5032. The age of 55 is now fixed before a man can claim his retirement?—I will read the clause from the scheme, "Any man, whether incapacitated or not, who shall leave the force, having attained the age of 55 years, and completed 30 years' service, except for misconduct, shall receive a pension of the maximum amount, namely, two-thirds of his pay.

5033. You would say, as I understand, on behalf of the men, that they would be better pleased if they had a limit of service only?—Yes; I think speaking as a practical man, that it would be better to have a limit of service; a certain number of years named, at the end of which service a man should be entitled to his pension, but when the Board considered it, there were found difficulties which I do not myself quite understand but the Board does, and they agreed on those terms; the age being 55 years.

5034. Men entering at different ages, one man has a great advantage in obtaining his pension earlier than another in point of service?—Yes.

5035. That is a material objection, is it not, fixing the limit of age?—Yes.

5036. Do you consider a man might be employed up to the age of 55 with advantage to the brigade?—I think, as a rule, not.

5037. Then there is a lesser scale of pension which he might acquire for less service?—No, there is not.

5038. That is the only pension he can get?—That is the only pension he can get, except on a medical certificate, but on a medical certificate he can get a very liberal pension for other periods of service.

5039. But men are probably disqualified on account of age younger than 55; sometimes those men would have to go with no pension?—They would come under the medical certificate.

5040. Is not that a serious defect in the scheme?—Yes, it makes the scheme less useful to the men than it would otherwise, and less useful to me as causing a difficulty in recruiting.

5041. And has a tendency to keep men in the brigade when they are no longer fully efficient?—I do not know that. It has not been in action long enough for me to say. We have given five promotions under this scheme, which have been of great advantage to the brigade, and for which we are grateful to the Board, and we have not encountered any difficulties as yet; therefore, on the whole, the men are satisfied with this scheme, although they do hope that eventually this clause will be altered.

5042. Do you desire to add your pamphlet to the evidence?—Not at all. I have no desire upon the subject, and I am afraid it will be rather lengthy for the purpose, but of course it is entirely at the service of the Committee in that or any other way. Perhaps it would suit the Committee to have an amended list of theatres destroyed by fire. (*The same was handed in.*)

5043. *Chairman.*] All you can do is to protect the public by the construction of such securities as you have suggested within the building itself?—Yes, and by arrangements made beforehand for the immediate extinguishing of any fire which may occur within the building. If they paid attention to these two points, I hold that would reduce the danger of a panic very considerably.

5044. Mr. *Hayter.*] You require, as I understand, legislative authority before you use chemicals mixed with water for extinguishing fire?—I do not suppose we should require legislative authority, but I think it would put my Board in a very responsible position if I were to use chemicals which resulted in undue damage to property.

5045. *Chairman.*] Would it not be violating a patent?—There are many chemicals which are not patented; the contents of a sewer would be very much more available for putting out a fire than the ordinary contents of the water pipes, but if I were to use it, I should be incurring a very serious responsibility; I should never use it unless where danger to the whole neighbourhood was threatened.

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5046. Mr. *Kinnaird.*] You stated that the sewage water was so effective; can you give the reason for that?—I understand it is from the large amount of ammonia it contains; so also I know that salt water is more efficacious than fresh for the purpose, but I should be very sorry to use salt water in the docks, supposing the salt water was available, on account of the injury it would cause to the contents.

5047. Can you give any suggestions to the Committee for the better working of the salvage corps?—I think they be made responsible for the protection of all property as quickly as possible after the fire was extinguished.

5048. At this time they are not?—They are not responsible. The great damage occurs between the time the fire is extinguished and that at which the property is removed for sale or distribution, as the case may be, and I think that that loss might be very much reduced.

5049. You think the loss might be very much reduced by more expeditious action?—Yes, by more expeditious action on the part either of the salvage corps or some other body; there is no arrangement at the present time for the protection of property of uninsured persons after a fire.

5050. Can you make any suggestion how that could be accomplished; could it be made a part of a police regulation?—I have no doubt that the police could undertake the duty, but of course they would require to be increased for the purpose, and my object in alluding to that in the early part of my evidence was simply to deprecate the establishment of any other constituted authority for the purpose of dealing with fire. We have already four different authorities, and I think experience has shown that it would be wiser to reduce the number than to increase it. I particularly deprecate voluntary assistance.

5051. The salvage corps is a voluntary body, is it not?—The salvage corps, if they could undertake the duty for all purposes, would, no doubt, do good, but they might not consider it their function to do it, and there might be very heavy expenses in working the salvage, as it is called; removing the damaged goods, selling them, and so on. I should say that it would be very much better for the existing salvage corps to do it than to establish an additional force, but if they will not do it, and will not use sufficient energy in realising property immediately after a fire, then I say the police, or some other body, should undertake the duty on behalf of the uninsured public. The uninsured interests in London are very large.

5052. Indirectly it would be to the advantage of the fire insurance companies, one would think, to do something for the uninsured?—I should say so, in the same way as before the transfer of the fire brigade; the fire brigade worked for the uninsured as well as the insured, whereas the salvage corps now only work for the insured.

5053. Has any evidence been given upon that point?—The evidence of the superintendent of the salvage corps goes to show the proportion between the insured and the uninsured property, and he has given such evidence as might lead to the establishment of an additional corps for salvage.

5054. Mr. *Forsyth.*] You stated, I think, that you thought the men of the fire brigade in London were better trained than the firemen in other brigades elsewhere abroad?—Yes.

5055. Is it not the fact that the men of the fire brigade in America are exceptionally well trained?—It is not the fact that they are exceptionally well trained.

5056. At the time of the outbreak of the war between the north and south, were not the fire brigades formed into regiments and made some of the most efficient regiments of the service?—Yes, they formed a very good regiment, I understand.

5057. Does not that show that they had been well trained?—I do not think there is any connection between the two things.

5058. With regard to discipline and alertness, for example?—I do not think with regard to discipline any country in the world could learn anything from America; discipline is the weak point of the United States.

5059. Now, supposing there were no salvage corps at all in London, I suppose at all fires there are more or less policemen present?—Yes, there are.

5060. Is it not their duty, then, with regard to property that has been left on the

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the premises, when the fire has been extinguished, to protect that property?—I do not think it has been made their duty. I think they leave the salvage corps to do that altogether.

5061. Because they are a salvage corps, but suppose there was no salvage corps at all and a fire took place in a particular warehouse, or although the fire was extinguished there was property standing there not destroyed by fire, is it not obviously the duty of the police to take care of that property until it is removed?—Yes, but that I think would hardly cover the point referred to by the chairman of the salvage corps; it is realising the property afterwards, and making the most of it, which is the most important question.

5062. Is not that the interest of the owner of the property?—Yes, it is; if there were no one left to take care of his property it would be deteriorated.

5063. And to guard it from thieves?—Yes.

5064. Is it not his interest and his duty to take care that it is realised afterwards?—I presume it would be. In the case of private houses there would be no difficulty in the matter; but in cases of large property there would.

5065. In the case of a large warehouse, which I will presume belongs to some wealthy company, what difficulty would you have after the property had been guarded by the police, in having the property sent to an auction-room or sold upon the spot, as the case might be?—I cannot say what the difficulties might be, but they are very great; sometimes nothing is done for weeks afterwards.

5066. Mr. *Locke.*] Now with regard to America; when the theatres catch fire, is it the case that they are always burnt down?—No, I think not always.

5067. The last which did catch fire was burnt to the ground, was it not?—Yes; the Brooklyn Theatre was burnt to the ground.

5068. Do you know in what way they put out fires in America?—Yes, I have heard a good deal about the ways of dealing with the theatres. I think, as far as external resources go, they do very well; but where they fail in America, we fail here; first, in internal arrangements; those are not what they ought to be, either for the escape of the audience, or afterwards for the reduction of the damage by fire.

5069. Is not there some difference between the houses in America and those in England; they are more easily burnt down, are they not?—From what I have heard of the recently erected theatres there, they are very well erected.

5070. What are they built of; wood, or stone, or brick?—There are no buildings erected of wood in any large cities of America recently. There are strict laws against it.

5071. Then how do the fires run to such a great extent?—I am unable to account for it. One reason is the absence of discipline on the part of the firemen; undoubtedly another is the absence of manual engines.

5072. But there have been some immense fires in America?—There have been within the last few years some immense fires.

5073. But how is it that those persons who have charge of fires have let all this property be burnt down?—I cannot say, but it is the fact.

5074. Therefore, I suppose, we may say we know very little about it?—I know a good deal about those who have the charge of the fire brigades there.

5075. But how have they let these large amounts of property be burnt down?—I have my own opinion.

5076. What is it, do you imagine?—I think that the absence of manual engines has been a serious defect in all the American organisations for protection from fire.

5077. And then they have no water supply, have they?—They have, in some places, an excellent supply. There could be no better supply than was used at Chicago, at the great fire, and at the Boston great fire. We have no such supply available in London.

5078. Now, with regard to the theatres of Paris, there is a difficulty in England in persons coming in and going out of a theatre, that there are not many entrances?—That is so.

5079. Have you examined the theatres in France, and ascertained how it is they go in and out there; whether it is owing to the number of entrances to the

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the theatre, or that the theatres there, generally speaking, have four sides; are you aware whether the entrances are used on all four sides?—Where entrances exist on four sides they are always used, but I do not think, in all cases, you will find that there are entrances on all sides. In some of the recently-built theatres in Paris there is a very great improvement; and there is now one theatre which I consider the model of the world in that respect, and that is the New Opera House.

5080. *Chairman.*] That stands by itself?—That stands by itself. Its corridors are so placed that I believe they will contain the whole of the audience. and I believe that if a fire occurred in that house, the audience might remain to see it extinguished.

5081. What is the reason of that?—The house is built throughout of heat-proof materials, and there are large corridors for the immediate reception of the audience from the dangerous parts of the house.

5082. There are entrances all round that theatre, are there not?—Yes, there are a great number of entrances on every side.

5083. In fact all round the theatre there are entrances?—Yes, there is no danger in that sense.

5084. Is it not the case in France, that in a great many theatres which are upon the ground, they have entrances round about them?—Yes, that is so.

5085. Is it not the fact that in many of those places where there are entrances, shops are placed, which prevents the advantages which were expected to arise from those entrances; that being used as shops, they cannot be used as accesses?—I think the entrances lie between the lines of shops.

5086. Are there not, generally speaking, shops made in the sides of those entrances?—Yes, the passages are continually used; the audiences in French theatres have different habits from the audiences here; they frequently go into the streets altogether, between the acts, consequently the arrangements for them are very much better than they are here.

5087. Is not that from the end of the building?—No, from the side; where there are openings they use them for passing in and out between the acts.

5088. But if that is so, is it not the fact that they are used as shops and not as passages?—I have never heard of such a case.

5089. Do you think the audience always do come out at those places?—I think that the audience always come out of such places as are in use.

5090. But you do not know how many or how few there are?—I think the entrances and exits in every French house are sufficient for the audience.

5091. There are, at all events, more openings than in English theatres?—Yes, there is more facility for an audience passing out.

5092. *Chairman.*] There is only one question which I should like to ask you upon the evidence which you have given, and that is with regard to the superannuation scheme; I suppose you are aware that the question of a fixed period of years which a man must attain before he can claim his pension is one which is objected to generally by the police throughout the country as well as by the men of your brigade?—I have always heard that it was so.

5093. And that is the point upon which I understand you to say that your present scheme is unsatisfactory?—That is the case.

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APPENDIX.

Appendix, No. 1.

PAPERS handed in by Mr. *Chadwick*, 12th April 1877.

(A.) Appendix, No. 1.

REPORT of a SPECIAL COMMITTEE of the SOCIETY of ARTS on INSECURITY from FIRES, and from PANICS at THEATRES and PLACES of PUBLIC RESORT.

THE alarm created in this country by the great fires at Boston and Chicago led the Council to appoint us as a Special Committee to consider what protection science and practically applied art could give against ordinary fires and extraordinary conflagrations in this metropolis. On this reference we have already made one report, the result of a considerable examination, and this has been followed by an examination of the same topic before a Committee of the House of Commons, which has not yet concluded its labours. The subsequent terrible example of the fire and loss of life at the Brooklyn Theatre, and the apprehension of similar heedlessness and want of foresight, as a family characteristic here, have led to a resumption of our labours for a special examination of the existing means for preventing the like calamities, including the loss of life from rushes of audiences under panics, as well as from fires in the theatres of this metropolis.

From the inquiries made, we find that the means in use in the theatres in this metropolis exhibit varied degrees of imperfect protection, some requiring little addition, others requiring almost entirely new construction, and all needing additions and systematised provisions for the public security. In some of the theatres the internal provision of water supply, by properly distributed hydrants, appears to be as satisfactory as the existing imperfect conditions of the metropolitan water supply will allow. In these—the larger theatres, chiefly—there appears to be, also, the number at present required of trained firemen for the application of the water supply; but in none is there an amount of trained men for the purpose, which, we shall show, a proper application of sound administrative principles would provide. In a proportion of the theatres the provisions against fires appear to be utterly inadequate; scene shifters, untrained men, are dressed up as firemen. Within the last 30 years there have been 57 fires in the theatres in London, in which seven have been totally destroyed. Their existing conditions as to danger from fire are accurately denoted by the insurance risks, determined on careful examination. The mean of the premiums required for theatres are twenty times greater than in first-class private mansions, six times greater than in warehouses containing cotton goods, or 3 *l.* per cent. The premiums range, however, from 30 *s.* per cent. in theatres of the best construction and organisation, to six per cent. for the theatres of the lowest grade in these respects.

In several of the theatres the architectural arrangements for the safety of the audience, by means of speedy exit by proper passages, appear to be dangerously defective. In some, additional means of exit are provided, by extra doors opening outward, but there appears to be no regular and responsible authority to see that these doors are always kept unobstructed, or in a fit condition. It appears to be optional whether the managers of theatres, or of other places of public resort, apply or not for the services of the police force for the maintenance of internal order and security. Where they do apply for the service of the police for these purposes, the Commissioners exercise their discretion in prescribing the minimum of force which they deem proper to be employed. In a number of cases the services of the police are dispensed with, chiefly in inferior establishments, where, for the maintenance of public order, they are generally the most required.

The general conditions as regard disposition of the protective force appear to contravene the primary principles of administrative economy and of the public security. In the larger theatres, for example, there is one section of men trained in the use of fire-engines, and to act in the application of the means at their disposal when a fire occurs, but these do nothing else in the long intervals of their occurrence; and there is another section of

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a public force, the police force proper, untrained as firemen for any concurrent action when fires do occur.

On the other hand, we have the example of the application of a combined force, the police, all trained to the application of fire-hose and engines, directed to the protection of the larger public buildings; the Houses of Parliament, the Woolwich Arsenal, the British Museum, the National Gallery, the General Post Office, and the larger Government offices. Take the example of the British Museum, as a place of popular resort, especially on holidays; the whole police force in charge there is, with the more specially trained firemen, trained to act in concert in the occurrence of any fire, as well as in the maintenance of order on all ordinary occasions when there may be no fire. Under the existing arrangements at the theatres there is, then, only a half-trained force as against fire extinction, and a trained police force to act when there may be no fire, but when there may be disorder and panics, by which life is endangered. Moreover, the half-fire brigade force within the theatre is confined very much to the application of the internal appliances, with auxiliary action from the distinct and distant brigade force when this has got to the spot. By arrangements on the footing of a combined force, on the administrative principles in action at Manchester, Liverpool, Glasgow, and elsewhere, with a constant supply of water kept at high pressure, and with an extra number of hydrants immediately on the outside of the edifice, the means within the theatre would be immediately supplemented by auxiliary jets of great power in two or three minutes, or in a third of the time practicable under the existing conditions of a separate brigade force. The lowering of the jets by the simultaneous use of a number, would be met by telegraphing to the chief or highest water station, whence, the surrounding private services being cut off, an additional pressure could be put on within two or three minutes sufficient to sustain all the jets in greater force than could be brought to bear by the steam or manual engines on their arrival. For example, if the ordinary pressure on the mains in or surrounding the building was 100, the distant pressure that would be brought to bear direct from the distant reservoir might be 200. To take the example of the instance of the fire at the Pantechnicon. Had it been under such protection as that proposed, several powerful jets in the interior of the building would have been brought to bear upon the fire within two or three minutes with a probability of its immediate extinction. In about the same time, from properly arranged hydrants fixed on appropriate enlarged mains, at high pressure, a number of auxiliary jets could have been brought to bear from the exterior of the edifice by the police, who would have simultaneously shut off, for the time, the private service supplies; and on telegraphing to the highest water station, pressure would at once be obtained if the trunk mains of the various companies were united and connected with the high road reservoirs to sustain the force of all the jets inside as well as outside the building in simultaneous action. By these combined means a force exceeding that of all the steam or manual engines might have been brought to bear in a third of the time required for the arrival of the steam or manual brigade engines.

In illustration of the existing fragmentary arrangements, and of the different degrees of fire risks incurred by losses of force, it may be stated, by way of example, that in a large theatre, where the internal arrangements as to the disposition of hydrants at constant supply under high pressure are sufficient, it would be deemed a satisfactory provision by most insurance offices that there should be six trained firemen in attendance during the performance, three during the night, and one during the day, unless rehearsals are going on, when there are two. The duties of these firemen extend only to the fire contingency, however remote it may be. At the same time there will be in such a theatre an equivalent police force, whose service is to regulate the admission of visitors, to maintain order and to prevent theft, but who have no special service for the extinction of fire, no connection with the firemen, and no trained concerted action on the occurrence of a fire; such action as they might take would be the very inferior action of a voluntary and irresponsible service. If the administration were on the same footing as it is at the British Museum, viz., that of an amalgamated force, there would be a double force within the theatre to act at once against the fire, and from outside the edifice, and from the nearest police stations, on the amalgamated system of Manchester, Liverpool, and Glasgow, the trained police would be available in number, and there would be an auxiliary trained force brought up usually in a third of the time that the brigade can, on the present disjointed system, be brought to bear. One trained fireman (a policeman on the nearest beat) is worth more than two or three trained men, for the object in question, at the brigade station. If the arrangement of the force were on the footing of the amalgamated forces at the British Museum and other public institutions, and were confined to the use of the means within the theatre for the extinction of fire, that arrangement of itself would be held to be an additional security operating to an important extent in the reduction of the insurance charge. But if, in addition to this augmentation of the internal forces, there were the external addition of proper mains, kept at constant high pressure, with proper hydrants, as above described, immediately available by the amalgamated trained forces outside, the risks would be reduced, even more than in those cities, and the insurance charge also in the like proportion. The interior amalgamation of service may be considered as equivalent to a double force; and the exterior as well as interior amalgamation more than a quadruple force.

As a rule, external hydraulic arrangements, on the correct principle, of large mains with hydrants in constant use, would be of greater security than the best of the ordinary internal

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internal arrangements for the protection of large edifices. On the sudden outburst of a great fire, the passages are commonly filled with suffocating smoke, and often with flame, which render the hydrants in the internal passages inaccessible, and generally cut off communication with superior reservoirs, and of this there have been frequent large instances. At the War Office, for example, there are displays of neat and elaborate provisions of hydrants and hose in the passages on all the stages; but, if a fire were to burst out amidst the stores and inflammable materials at the basement, communication with the internal appliances would be speedily cut off. The internal protective arrangements in the British Museum may be exceptionally good; but, from want of room for the display of specimens, and waiting the completion of the new construction at South Kensington, there are at the basement of the Bloomsbury building immense collections of natural history, preserved in spirits of wine—dangerous inflammable magazines—which, if fired by accident, would speedily inflame the superior part of the building, so as to neutralise the working of a great part of the internal appliances. This condition, by the way, exemplifies the unwise economy of protracting the works at the new Museum, and postponing its completion. The external appliances described, always in use and always immediately accessible, capable of being brought to bear through windows and external apertures, and elevated to the higher stages by ladders, are the greatest securities necessary.

It is to be borne in mind that, under a combined system of the fire service in connection with the police force, and a system of constant water supply on a public footing, as in Manchester, Liverpool, and Glasgow, the need of steam or manual fire-engines is reduced, as stated, to about three or four per cent. of the cases of fire; and the losses of life and property from fire to about one-third of the losses prevalent in the metropolis; the arrangements, too, in those cities are as yet materially incomplete. For example, as stated by Mr. Bryson, the head of the fire brigade department of Glasgow, the distributing apparatus for the water supply has been arranged simply for ordinary domestic consumption, and without the adaptation of enlarged sizes of pipes due to the public edifices, to large warehouses, and other properties. Some of the theatres in the chief thoroughfares of the metropolis will be situated near suitable large mains, but others in side streets will require proper provisions to be made in that respect. Moreover, from defective town drainage works, and the ignorance of the local authorities, or the sinister interests of scavenging contractors or other causes, the method of street cleansing by the jet, in use in Paris, Vienna, Hamburg, and other cities, recommended on sanitary as well as economical grounds, has not been brought into use here, thought it appears to be at length accepted in the City of London (after having been recommended 10 years ago by the corporation engineer). The public are hence deprived of the proper security of an apparatus in constant readiness because in constant use. In this metropolis the present mean distance of the brigade stations—a mean of closely and comparatively widely populated districts—appears, from the returns of the distances run, and the number of fires attended, to be about a mile and a half. By the combination of the fire brigade with the police force at Manchester, the stations for engines, hand or horse, are brought to an average distance of 800 yards, a gain which, by similar arrangements, would be achieved here by the adoption of the police-stations as fire-stations. But, by the proper distribution of hydrants, at Glasgow the immediately available relief would be brought within every 50 yards; or, as the City of Hamburg, within every 100 feet. For a great edifice like a theatre, the hydrants would give all the security within some five or six minutes that can be brought to bear by the existing separate brigade force within some 20 or 30 minutes or more. The same want of forethought is displayed as to the arrangement of water-pipes for the large waterside warehouses, where pipes have been provided only for domestic use, and these of not above one-tenth the capacity that would be required for the extinction of fire, and that might be made available, as we have exemplified, in a fifth or less time than it can be now brought to bear upon those same warehouses by floating engines from the river, especially when the tide is low.

Further, it does not appear to be understood by the witnesses examined before the Committee of the House of Commons, how immense is the gain of power desirable through bringing all the water supplies of the metropolis under unity of action and management as against great fires. The first effect of machinery for fire extinction would be to extend the pressure of the most elevated reservoirs over the entire area, and, in the opinion of Mr. Quick, who is an hydraulic engineer of the largest experience in the metropolis and in Europe, to give to the lower district an addition of probably a third or more of additional height for all the jets now obtainable there. Another effect of unity, as pointed out by the insurance companies several years ago, would be, in case of need, to enable the whole force of the entire metropolitan supply to be concentrated at once upon any one district or sub-district threatened with a large conflagration. By electricity, this concentration of power from miles of distance, is effected almost as speedily as if the great reservoirs were contiguous to the spot. A short time ago, at Liverpool, on the lowering of the jets by the consumption at a fire, a fire messenger was dispatched on horseback to the chief pumping station to direct additional power to be put on. Now the electric telegraph does this and would do so in the metropolis, and in a minute or two the accelerated stroke of the piston would be perceived in result from the most remote station several miles distant, and leave nothing to be sought from locomotive engine power. Electric science also gives means of instant warning of the increase of temperature, or of a fire arising in a closed room in any part of a public building in which there is no one present during the day or night.

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In the rooms of cotton and other manufactories, where the materials are frequently in flames in the course of the operations, "extincteurs" are now being kept and used with great advantage. These implements, it was recently shown at the Congress of Hygiène, at Brussels, are getting into extensive use on the Continent, and will prove of peculiar value as being less injurious to property than water-jets, if kept at hand in the most dangerous places for fire, *e.g.*, the workshops of theatres, and the places of preparation in pyrotechny for scenic effects.

On a competent and impartial review of the operation of these available administrative principles and the evidence of engineering and mechanical appliances afforded in our chief provincial municipalities, all of which, if adopted, would place the metropolis in advance of them, the fire-insurance risks in the peculiarly dangerous edifices in question, may be greatly reduced below the best of those existing, most probably to one-third of what they now are.

Mr. Wybert Reeves, the manager of the Royal Theatre at Edinburgh, has expressed very clear views of structural improvements and scientific appliances, requisite for the protection of theatres from fire and of audiences from panics. But the care and certain use of such appliances would require hands of more than common training, who might act very safely under such supervision as his own; but even under his own, an insurance company would require a much higher premium than they would accept if the appliances were under the care of a trained and combined public force known to them, such as the trained force having charge of the British Museum and the public edifices cited,—apart from the additional gain of security and reduction of charge derivable from the improved external appliances shown to be available.

In respect to the general system of combined internal works, and of combined external service for their application, they will need, at all events, for their initiation a corresponding special service beyond any presented by the existing authorities. It must be explicitly stated that little but expensive further failure is to be expected from those authorities who have failed to see or appreciate the great economies and protective advantages of the unity of the water supplies, which benefits have been represented for years;—who have failed to see them, or to take any action upon them when they were urgently represented to them by the insurance companies after the Chicago fire;—who could not perceive the securities derivable from a patrolling force of several thousand police trained as firemen, or of double and nearer stations;—who visited Manchester and Liverpool, and returned from thence without any due perception of the economies achieved there by action on the administrative principles stated; and who returned from thence with such monstrous exaggerations of the expense of the conversion from the intermittent to the constant supply and of hydranting the streets, as to raise obstructive difficulties in the way of those measures, by the operation of which the losses of life and of property are reduced to nearly one-third the rates that are prevalent in the metropolis. Officers of the greatest practical experience are clearly of opinion that the existing local administration is continued at the expense not only of continued excessive losses of life by fire and such manifest increase of them as has been displayed during the last year, but of the danger of great conflagrations, such as those of Boston and other cities.

On the special question of the theatres and edifices of public entertainment there remain to be considered the securities needed and obtainable against the loss of life from panics. On occasions when there are no fires, but disorder, or at fires when the greatest danger may be from panic, the special firemen, or brigade force, would act as an important contingent to the line of the police force. At the British Museum, for example, the special firemen, on occasions when there is no fire, form part of the police force, for the maintenance of order on the occasions of crowds at holidays. On the occurrence of such an event as a panic, as at the fire at the Brooklyn Theatre, the combined force would first act against the greatest immediate danger to life, the danger from the panic. The chief police officer on duty at the theatre would give the command, "Men, to your stations; officers, to your posts;" this would be the chief avenues to be thrown open. He would then go on the stage and tell the audience that if they did as they were told he would assure them of their safety; and he would tell those in the gallery to remain in their places until the upper rows got out as they were directed by the police. Simultaneously telegraph messages to the nearest police-stations would bring up the support from thence of the additional external trained men to aid in the maintenance of order.

On a consideration of the principles of jurisprudence, for the protection of the public from fire, as by the enforcement of party walls, and of incombustible materials in cities, and on a view of the existing conditions of theatres and of places of resort, it will appear that private discretion as to mechanical internal arrangements of all places of public resort, and as to care for their maintenance and action, as well as protection from disorder, should be subjected to further restraints and tutelary police regulations. These establishments in the metropolis would participate in the advantage of the general external arrangements which have been so successful in our larger provincial cities, from the constant public supply of water, under the combination of the trained fire brigade force with the general police force. In requiring theatres to be placed, for the public security, on the footing of such public establishments as the British Museum and the National Gallery, in respect to the internal mechanical and police supervision, it appears, taking into account the reduction of insurance rates, by the diminution of fire risks, and also other benefits, amongst which would be the increased sense of security, and thence increased popularity of their entertainments, that no unremunerative charge need be imposed

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posed upon them, nor anything be required of them to do which it would not be their real interest to do if they had the means, which they now have not, of doing of themselves. It is to be borne in mind, that theatrical properties contribute largely to the local rates, from which they do not, in the present state of the local administration, receive equivalent advantage. The authority of the Lord Chamberlain has been exercised for the provision of proper means of exit for the audiences on the occurrence of panics. But he has no executive machinery, such as the police would supply, for seeing by regular trials, that those means of exit are kept ready and in a fitting condition. Presuming, as we venture to do, from the force of the precedents of the great advantages derived, in the instances cited, from the amalgamation of the trained fire brigade with the police force, that the provincial precedents of the gain in efficiency will be acted upon, it would follow that no place of public resort should be allowed to be opened without due authoritative provision of proper requirements, structural and administrative, for the public security.

In respect to the special structural arrangements for new theatres, and the use of incombustible materials, the committee can only refer to the evidence already taken, and published in the transactions of the Society. But the Science and Art Department, consulted by the French Government upon the subject of the construction of theatres in Paris and upon their police, appears to us to have yielded the most advanced and complete answers for practical application yet given, and to have left this Committee only the duty of expressing concurrence in them, acknowledging obligations for them, and of soliciting particular attention to them, as they are hereafter set forth in the Appendix.

On the subject of the provision of water supplies, we may make a further observation. The fact of the pressure on some of the mains, a very small portion in London being very low, has been made an objection to giving the protection of hydrants to any portion, or to the three-fourths of the whole of the houses, for which a very serviceable pressure, and for a great portion of the houses a very great pressure, is already available. The objection, which appears to have been received with great surprise by the manager of the Salvage Corps, as well as by others practically conversant with the subject, displays an entire absence of knowledge of the primary principle of prevention, the greater value of small supplies near, than of large supplies at a distance. At Manchester and at other places, fires are extinguished in a majority of cases by the use of a pail with a small hand-engine attached to it, which can be supplied with water on the spot. If the whole of the water supplied in London were delivered at so low a pressure that it would not rise higher than the basement of the houses, it would be worth while, nevertheless, to provide the whole of the streets with hydrants, so that the immediate supply might be brought to the doors for the use of such small implements until the larger engines could be brought to the spot. Over the whole of Paris the delivery of water is at a much lower pressure than in London, as low, perhaps, as most of the lower districts in London. It is to be noted, however, that it is proposed by the authorities there, in accordance with the principle of protection stated, to "make it imperative upon the proprietor of every house," which would include every flat, "to set up a hydrant sufficient for the supply of an ordinary fire-engine." This being the case, even with the low pressure of water there, "every door of every house in Paris will be under command."

The general conclusions deducible from the examination of the facts, specially relating to the theatres and places of public resort, maintained by private enterprise in the metropolis, may be thus stated:—

That by the combined application of settled principles of mechanical, engineering, and administrative science and art, the risks and losses of life and property in the edifices in question may be reduced to fully one-third of the risks that now attach to them.

But that such gain in public security is dependent on the close, authoritative, attentive examination and understanding of the precedents cited; of the practical working of their principles, and their adoption in clear and decided general measures of legislation; and on their competent administration in the metropolis.

Signed by order of the Committee,
P. Le Neve Foster, Secretary.

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(B.)

Legislation for Public Protection against Fires and Panics in Theatres in France.

Paris.

The Special Committee on the means of preventing fires are about to resume their labours in special relation to the means of preventing fires and the loss of life, consequent on panics from fires at theatres and places of public resort. Much information has been collected for them as to the condition of the London theatres. The following particulars have been obtained as to the course adopted for the attainment of the objects in Paris. It is especially to be noted that Paris generally will soon be in advance of London in its general provision of hydrants, and the application of public water supplies, for the protection of life and property, by hose and jet, as it already is in street cleansing.

Paris Theatres.—Regulations respecting their Construction, Arrangements, Public Safety, &c.

Previous to the year 1864 special privileges existed with respect to theatres, but in that year an Act was passed, giving every one the right to construct and work a theatre on giving previous notice of his intention to the proper authorities. At the same time a number of police ordinances, extending from 1790 to 1864, were repealed, and a single one issued in their stead. The regulations respecting construction are as follows:—

1. Everyone who desires to construct and carry on a theatre must make a previous declaration to the Minister of the Imperial household, and of the Beaux Arts, as well as to the Prefect of l'olice. To such declaration shall be attached detailed plans with sections, indication of the number of places, calculated on the basis of 80 centimetres in depth (32 inches) and 45 centimetres (18 inches) in width for those places which are to be let, and 70 (28 inches) by 45 centimetres (18 inches) for the others. The building not to be commenced until formal permission is given after examination. With the exception of certain departures, which may be admitted under circumstances, the building must be constructed and distributed according to the following rules:—

2. The building may or may not be isolated. In case of isolation, there shall be left all round the theatre, except where it is bordered by the public way, a free space or road (*chemin de ronde*), which need only be three inches in width, provided the adjoining houses are not lighted from such road or space; but in the contrary case the width shall be increased in accordance with the importance and arrangement of the edifice.

In case of a theatre abutting on another building, a wall at least in brick, at least 25 centimetres (10 inches) in thickness, shall be built to protect the party walls. The thickness of this wall to be increased like the free space mentioned above, and for similar considerations.

The regulations concerning construction, especially with the view to the prevention of accidents from fire, are as follows:—

3. The inner walls, the walls which separate the dressing-rooms from the theatre, the proscenium wall, the wall which separates the auditorium, the vestibule, and the staircases, must be in masonry.

4. The doors of communication between the dressing-rooms and the theatre shall be of iron, and swinging so that they may be always closed.

The proscenium wall, which rises above the roof, may only be pierced by the opening of the stage and by bays of communication closing by means of iron doors.

The opening of the stage must be provided with a curtain composed of iron wire, with links of not more than ·05c. (2 inches), which shall completely cut off all communication between the combustible portions of the theatre from the auditorium. This curtain to be kept up by incombustible cordage.

The fixed scenery in the upper part of the front of the stage must always be incombustible.

5. All the stairs, the flooring of the auditorium, and the partitions of the corridors should be of incombustible materials.

6. The ceiling of the auditorium to be of iron and plaster.

Fire Engines and Water Supply.

7. In one of the most elevated positions of the proscenium wall and under the roof there shall be placed an apparatus for aid in case of fire, with a column of water, with additional hydraulic pressure in case of necessity, to supply a jet of water reaching the highest parts of

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of the building. The capacity of the apparatus to be determined by the importance of the theatre.

8. The pumps must be placed on the ground-floor in a place separated from the theatre by walls in masonry.

9. They must always be supplied with water from the city works, and stowed in reservoirs, and by a well, so that each of these sources alone should be sufficient for the full working of the pumps.

10. Outside of each place of public amusement must be established hydrants, supplied by the water of the city, each hydrant being sufficient for the supply of a fire-engine; the number of such hydrants in each case to be fixed by the authorities.

Heating and Ventilation.

11. The auditorium shall not be warmed except by flues, the furnaces of which are situate in the cellars. The orifices of the flues to be not less than 30 centimetres (12 inches) beneath the flooring.

12. All places of public amusement should be properly ventilated; the air should be renewed by means, the efficiency of which shall be judged of by the authorities. Thermometers should be placed within sight in the corridors.

Arrangement of Scene-painters' Lofts, &c., above the Theatre.

13. No such place shall be permitted above the stage..

14. No workshops shall be allowed above the auditorium, with the exception of those for the scene-painters and tailors, and the floors of these shall be tiled. In the case of the scene-painters' loft, being placed in this position, unless the roof is formed of iron and plaster, the *sorbonne* (the place of the chandelier, apparently) must be shut in by a partition, made of broken stone and plaster, with a ceiling, tiled, and closed by an iron door.

15. No division of the space in the roof shall be made for any other purpose than those above indicated.

Corridors and Staircases.

16. The width of the corridors, the number and width of staircases, as well as of the entrance doors, shall be in proportion to the size of the theatre. In all cases there must be two staircases specially devoted to the public, and communicating directly with the street.

Scene Loft and Machinery.

17. Every theatre must be provided with a place for scenes and machinery outside its own walls, and under such conditions as the authorities shall approve.

18. No stores of scenery or machinery shall be made either beneath the stage or the auditorium, all such stores should be separated from the theatre by a wall or walls of masonry.

Restrictions concerning the Occupation of Shops, &c.

19. No shop or warehouse appended to a theatre shall be let for any trade or calling which presents special danger as regards fire in any respect. The chimneys of such shops, if they pass through the theatre or its dependencies, must be constructed of brick or other masonry, and carried up vertically to above the level of the roof. They shall also be further protected by means of a brick casing.

20. No person except the *concierge* and the treasury attendant is allowed to live in a theatre or any building which communicates with it.

The second portion of the ordinance relates to the management.

Approval of the Building, Police Service, &c.

21. No theatre shall be opened until the authorities shall have certified that it is well constructed, and with proper arrangements for safety, salubrity, and convenience. The modifications made in the interior afterwards, division of places, &c., to be the subject of a second examination previous to the opening.

22. The agents of the superior authority shall exercise a daily supervision, not only as respect to the dramatic censure, but also in the interest of order and public security.

23. There must be provided an office for the officers of police, and a guard-room.

24. A *commissaire* of police is charged with the general surveillance of each theatre; a suitable place shall be provided for him in the auditorium.

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25. Any person who may be arrested either at the door of the theatre or within its walls shall be taken before the commissaire, who will decide on the case.

26. The police are specially charged to maintain order and free circulation outside of the theatre, as well as with the regulation of carriages. They will not enter the auditorium except when the public peace is in jeopardy or when called in by the commissaire.

27. In every place of public amusement a medical service shall be established conformably to the regulations of 1852.

28. The service of the firemen is arranged according to a plan adopted in 1852. Tell-tale counters, showing the rounds made during the night, shall be placed in the interior of each theatre in such places as the commander of *safeurs pompiers* shall select.

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29. The directors shall establish urinals, fixed or otherwise, suitable to the locality, and under such conditions as shall be approved by the authorities.

(Here follow the regulations respecting prices, placards, &c., and other subjects, only of local interest.)

58. At the close of the performance, all the side doors and other means of exit shall be opened, in order to facilitate the egress of the public.

These doors should all open outwards, and they should be constantly kept perfectly free of obstructions of any kind, within or without.

All the doors of the boxes shall open from within at the will of the occupiers.

59. The directors are expressly forbidden to cause the lights to be extinguished in the auditorium, the staircases, the corridors, or vestibules, before the theatre is completely emptied.

60. Oil lamps, placed in glass lanterns, shall be kept burning from the moment of the opening of the theatre till the closing, in sufficient numbers in the auditorium, the corridors, and staircases, to prevent complete obscurity in case of the gas becoming extinguished.

The rest of the ordinance refers to the regulation of carriages, &c.

With respect to general precautions against fire, the "*Bulletin Francais*" says that it is proposed without delay to complete the arrangements for the protection of Paris against fire. The authorities possess five steam fire-engines, of which only three are at present in use, the two others being in store at the Conservatoire des Arts et Metiers. It is found that all eight are required to complete the materiel for the protection of the city. The number of hydrants calculated to be necessary for the supply of the steam fire-engines is 600; the present number is only 345, but it is to be immediately increased. It is proposed, further, to make it imperative upon the proprietor of every house to set up a hydrant sufficient for the supply of an ordinary fire-engine; this being the case, with the pressure of water in the city, every floor of every house in Paris will be under command.

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Appendix, No. 2.

PAPER handed in by the Hon, S. *Ponsonby Fane*, 12 April 1877.

RULES FOR THEATRES LICENSED BY THE LORD CHAMBERLAIN. Appendix, No. 2.

1. ALL doors and barriers to open outwards, or to be fixed back during the time when the public are within the theatre.

2. All gangways, passages, and staircases, intended for the exit of the audience, to be kept entirely free from obstructions, whether permanent or temporary.

3. No part of the auditorium to be without at least two means of exit in case of need.

4. All doors not habitually used for exit, but available as additional means of escape in case of alarm, to be indicated by printed placards in plain characters.

5. An ample water supply with hose and pipes to be available to all parts of the house, where possible on the high-pressure main.

6. All fixed and ordinary gas burners to be furnished with efficient guards. Moveable and occasional lights to be, where possible, protected in the same manner, or put under charge of persons responsible for lighting, watching, and extinguishing them.
No white metal gas-pipes to be used in the building.

7. The foot-lights or floats to be protected by a wire guard. The first ground-line to be always without gas, and unconnected with gas, whether at the wings or elsewhere. Sufficient space to be left between each ground-line, so as to lessen risk from accident to all persons standing or moving among such lines.

8. The rows or lines of gas-burners at wings to commence four feet at least from the level of the stage.

9. Wet blankets or rugs, with filled buckets or water-pots, to be always kept in the wings; and attention to be directed to them by placards legibly printed or painted, and fixed immediately above them. As in Rule 6, some person to be responsible for keeping the blankets, buckets, &c., ready for immediate use.

10. Hatchets and hooks to be in readiness to cut down hanging scenery in case of fire.

11. The regulations as to fire to be always posted in some conspicuous place, so that all persons belonging to the theatre may be acquainted with their contents; every breach or neglect of them, or any act of carelessness as regards fire, to be punished by fines or dismissal by the managers.

12. An annual inspection is made of all theatres, particularly with regard to the appliances for the prevention of fire, and accidents therefrom, and the means of exit from the building. It is expected that all alterations suggested for the safety and convenience of the public will be carried out before the issue of the annual license.

13. No structural alteration to be made in the theatre without the sanction of the Lord Chamberlain. Plans of such proposed alterations must be sent to the Lord Chamberlain's office.

14. A copy of every new piece, or alterations of old pieces intended to be produced, to be forwarded for license to the Examiner of Plays, seven clear days before such intended production. No alteration of the text when licensed for representation to be permitted without sanction.

15. Copies of all play-bills to be sent to the Lord Chamberlain's office every Monday, and whenever a change of performance is announced.

16. Notice of the change of title of a piece to be given to the Examiner of Plays.

17. The name and private address of the actual and responsible manager to be printed in legible type at the head of each bill.

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18. Admission to be given at all times to authorised officers of the Lord Chamberlain's department, and of the police.

19. No profanity or impropriety of language to be permitted on the stage.

20. No indecency of dress, dance, or gesture, to be permitted on the stage.

21. No personalities or representations of living persons to be permitted on the stage, nor anything likely to produce riot or breach of the peace.

22. No exhibition of wild beasts or dangerous performances to be permitted on the stage.

23. No masquerade or public ball to be permitted in the theatre.

24. No encouragement to be given to improper characters to assemble, or to ply their calling in the theatre.

25. Refreshments to be sold in the theatre only during the hours of performance, and only to the audience and company engaged in the house.

26. No smoking to be permitted in the auditorium.

27. Theatre licenses are granted for one year from the 29th September. Licenses are granted also for shorter periods, but all licenses cease on the day above mentioned.

28. No public entertainment to be given in the theatre on the days excluded from the license.

29. Applications for licenses, with the names and addresses of the actual and responsible manager and of his proposed sureties, who must be resident householders and ratepayers, must be forwarded to the Lord Chamberlain's Office seven clear days before the day for which the license is required.

30. Theatre licenses are granted only for buildings in which the above regulations can be carried out, and on the express condition that these and every other reasonable and practicable precaution against fire, or the dangers arising therefrom, are adopted.

31. The manager is solely and entirely responsible for the carrying out of the above regulations, for the management of his theatre before and behind the curtain, and for the safety of the public and the members of his company.

(signed) *Hertford*,
Lord Chamberlain.

Lord Chamberlain's Office,
February 1876.

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Appendix, No. 3.

PAPER handed in by the Hon. *S. Ponsonby Fane.*

METROPOLITAN THEATRES LICENSED BY THE LORD CHAMBERLAIN. Appendix, No. 3.

1866.	1877.
Adelphi (rebuilt in 1858).	Adelphi.
Alexandra. Highbury Barn (pulled down in 1871–72).	
Astley's (partially rebuilt in 1862).	Astley's.
Bower Saloon (rebuilt in 1875). Now	Stangate.
Britannia (built in 1858).	Britannia.
Cabinet. Now	King's Cross.
City of London (no longer a theatre).	
Effingham Saloon (rebuilt in 1867). Now	East London.
Grecian Saloon.	Grecian.
Haymarket.	Haymarket.
Her Majesty's (burnt down and rebuilt 1867–68).	Her Majesty's.
Lyceum.	Lyceum.
Marylebone (called Royal Alfred from 1868 to 1873).	Marylebone.
New Royalty.	Royalty.
Olympic.	Olympic.
Pavilion.	Pavilion.
Prince of Wales's.	Prince of Wales's.
Princess's.	Princess's.
Sadler's Wells.	
St. James's.	St. James's.
Standard (rebuilt in 1867).	Standard.
Strand.	Strand.
Surrey (rebuilt in 1865).	Surrey.
Victoria (rebuilt).	Victoria.
Gallery of Illustration (no longer a theatre).	
25 in all.	

New Theatres since 1866.

Aquarium.
Alhambra.
Albion (licensed in 1867 as The Oriental).
Criterion.
Elephant and Castle.
Folly (licensed in 1869 as the Charing Cross).
Gaiety.
Globe.
Henglers.
Hackney.
Duke's (licensed in 1866 as The Holborn).
Opera Comique.
Park (licensed in 1873 as The Alexandra).
Queen's.
St. George's.
Variety.
Vaudeville.

Theatres occasionally Licensed between 1866 and 1875.

Surrey Gardens.
Philharmonic.
Sadler's Wells (in process of re-building).
Holborn Amphitheatre.
Garrick.
Regent.

Total Number of Theatres Licensed by the Lord Chamberlain, viz:—

In the year 1866 - - - - - - - - - - -	25
„ „ 1877 - - - - - - - - - - -	38
Total Increase in Actual Number - - -	13

N.B.—Drury Lane and Covent Garden are open under Patent.

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Appendix, No. 4.

PAPER handed in by Mr. *John Hollingshead.*

Appendix, No. 4.

LIST of MUSIC HALLS, CONCERT HALLS, and ONE CASINO, Licensed by the Magistrates in *London*; *Sydenham*, *Muswell Hill*, and *Woolwich* being included in *London*, because the Crystal Palace, and the Alexandra Palace, and the North Woolwich Theatre are worked by London Companies and Managers.

Agricultural Hall, Islington.	Middlesex, Drury-lane.
St. James's Hall.	London Pavilion.
Exeter Hall.	The South London, London-road, Borough.
Egyptian Hall.	The Marylebone.
Polytechnic.	The Borough.
The Oxford.	The Bedford, Camden Town.
The Canterbury.	Deacon's, Islington.
Gatti's, Westminster-road.	The Trevor, Knightsbridge.
Gatti's, Charing Cross.	The Sun, Knightsbridge.
The Metropolitan, Edgware-road.	Landsdowne, Islington.
Wilton's, Wellclose-square.	Rodney, Whitechapel.
Evans's.	Apollo, Bethnal Green.
The Royal, Holborn.	Westminster, Pimlico.
The Cambridge, Commercial-street.	Nag's Head, Lambeth.
Lusby's, Mile End-road.	Woodman, Hoxton.
The Neckinger, Bermondsey.	Swallow-street Hall.
Forester's, Bow.	Royal Aquarium, Westminster.
Winchester, Southwark.	Alexandra Palace, Muswell Hill.
Raglan, Theobald's-road.	

Total - - 37 Concert and Music Halls.

The Argyll Rooms Casino.—The one Casino licensed in London by the Magistrates for four millions of people, and the special profit of the proprietor, who is secured in a valuable monopoly.

About 20 public-houses, called generally "Free and Easys," having music licenses, and 10 local halls, district town halls, hold the same license—

Making this Total - - - - 67 Halls.
1 Casino.
68

The music halls, concert halls, &c., in this country that have sprung into existence since the passing of the Act of 1843, may be estimated as bearing the proportion of three to one of the theatres in the country.

Theatres in London Licensed by the Magistrates:—

The Court Theatre, Chelsea.	North Woolwich, Theatre and Gardens.
Bijou Theatre, Bayswater.	Crystal Palace, Theatre and Palace.
Cremorne Gardens, Theatre and Gardens.	Alexandra Palace, Theatre and Palace.

Making - - - - - 6 Theatres.
68 Halls.

Total - - - 74

Licensed by magistrates.
The nightly-holding capacity of these places is about equal to 160,000 persons.

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Theatres in London Licensed by the Lord Chamberlain:— Appendix, No. 4.

The Alhambra.	Princess's.
Opera Comique (an underground theatre).	Prince of Wales's.
Globe.	Sadler's Wells.
Vaudeville.	St. James's.
Folly.	Standard.
Variety.	Strand.
Hackney.	Surrey.
Adelphi.	Victoria.
Astley's.	Albion.
Britannia.	St. George's Hall.
Stangate.	Duke's.
King's Cross.	Amphitheatre, Holborn.
City of London.	Queen's.
East London.	Gaiety.
Grecian (holds also Magistrate's License for Halls and Garden).	Surrey Garden (holds also a Magistrate's License for the Gardens).
Haymarket.	Philharmonic.
Her Majesty's.	Hengler's.
Lyceum.	Elephant and Castle.
Marylebone.	The Park.
Royalty.	Criterion (an underground theatre).
Olympic.	The Regent.
Pavilion.	Aquarium Theatre.
Garrick.	

Making 45 theatres, with a nightly-holding capacity of about 76,000 persons. Windsor being a Royal residence, the Lord Chamberlain licenses the theatre in that town.

There are two London theatres that are neither under the control of the Magistrates nor the Lord Chamberlain, viz.:

Covent Garden Opera House and Theatre, a patent house, working under the Killigrew and Davenant Patent, which dates from Charles II.; and

Drury Lane Theatre, which claims to have bought one-half of this patent, but holds a more than doubtful title, which the Lord Chamberlain has never contested. Their holding capacity may be stated at 8,000 persons nightly. Thus we have in London:—

45 Lord Chamberlain's Theatres.
2 Patent, or so-called Patent Theatres.
6 Magistrates' Theatres.

53 - - Total.

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Appendix, No 5.

PAPERS handed in by the Right Honourable Marquis of *Hertford*, 23 April 1877.

— 1. —

Appendix, No. 5.

THEATRE REGULATIONS.

Lord Chamberlain's Office, St. James's Palace.

THE Lord Chamberlain presents his compliments to the manager of the theatre, and encloses copy of the rules for theatres under his Lordship's control.

These rules, though now put together and printed for the first time, do not differ in any material respect from those which have always been understood by the managers to be the existing rules of this Department. But the Lord Chamberlain has come to the conclusion that they should be communicated in writing to the managers and their sureties, in order that there may be no misunderstanding as to the responsibilities which they undertake on executing the bond required by the Act 6 & 7 Vict., on the issue of licenses for theatres.

The Lord Chamberlain takes this opportunity of impressing upon the managers the very serious responsibility under which they must personally be held with regard to the safety of the public, and of the artistes engaged in their theatres, in case of fire, or panic arising from an alarm of fire, and the consequent importance to them by every means in their power, of carrying out the rules for free exit from the theatre in such a contingency.

These rules will, in future, be annexed to all licenses issued, with such alterations and additions as may from time to time be considered necessary.

23 February 1876.

— 2. —

Lord Chamberlain's Office, St. James's Palace, S.W.

THE Lord Chamberlain has received many complaints of the inconvenience to which visitors to the theatres are subjected by the practice of placing extra chairs and seats in the alleys and gangways of the stalls and other parts of the auditorium.

This practice is not only inconvenient to individuals, but would be extremely dangerous to the whole audience in case of an alarm of fire. The Lord Chamberlain begs consequently to call serious attention to the subject, and to request that strict directions may be given to the box-keepers and attendants of the theatre that no seats or obstructions of any kind are to be placed in the gangways or passages of the theatre intended for the exit of the audience.

29 September 1875.

— 3. —

MEMORANDUM.

Lord Chamberlain's Office, 21 December 1876.

THE recent tragedy in the Brooklyn Theatre, at New York, has most properly turned public attention to the state of the London theatres with regard to the means of exit in case of an alarm of fire, and of preventing such panics as that which was the cause of so many lives being lost on that occasion.

The Lord Chamberlain, in February last, communicated in writing to the managers the

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the rules under which his licenses are granted, and he took the opportunity of impressing upon them the very serious responsibility under which they must personally be held with regard to the safety of the public in case of fire or panic arising from a well-grounded alarm, and the consequent importance to them of carrying out, by every means in their power, the regulations for providing abundant facilities of egress from the theatre in such a contingency. These rules were intended to apply to all possible exigencies, and the circular called particular attention to the absolute necessity of the following first four rules being attended to, viz.:—

1. All doors and barriers to open outwards, or to be fixed back during the time when the public are within the theatre.

2. All gangways, passages, and staircases intended for the exit of the audience to be kept entirely free from obstructions, whether permanent or temporary.

3. No part of the auditorium to be without, at least, two means of exit, in case of need.

4. All doors not habitually used for exit, but available as additional means of escape in case of alarm, to be indicated by printed placards in plain characters.

The Lord Chamberlain regrets that many complaints have reached him of extra chairs and seats being still placed in the gangways, a practice not only inconvenient to individuals, but extremely dangerous in case of an alarm of fire. He therefore gives notice that he has desired to be specially informed from time to time, and particularly during the ensuing Christmas holidays, whether this practice is continued, and if any flagrant case is detected of the rules being evaded, he will assuredly at once put in force the powers given him under the 6 & 7 Vict. c. 68, and will, moreover, refuse a license in future to any manager who has thus wilfully jeopardized the safety of the public.

There are, of course, many other precautions that might be adopted by any intelligent manager, according to the capabilities of his theatre, but so many practical suggestions have been made, or promised to be carried out, during the annual official inspections of the theatres, that it is unnecessary for the Lord Chamberlain to refer to them; and he confidently leaves it to each manager to do his best to guard against accidents of all kinds, and especially against the consequences of such panics as may be liable to occur at any time, without any reasonable cause, and without any blame to the management of the theatre, from a mere act of malice, mischief, or folly on the part of some one present.

— 4. —

MEMORANDUM.

Lord Chamberlain's Office, 23 December 1876.

THE CHRISTMAS HOLIDAYS AT THE THEATRES.

CONSIDERING the crowded state of the theatres during the Christmas holidays, and more particularly the large numbers of women and children attending the performances of the pantomimes, the Lord Chamberlain requires that all doors not habitually used for exit, but available as additional means of escape in case of fire or alarm, be regularly opened on every occasion when a performance takes place, from Boxing-day until the 1st February next.

The Lord Chamberlain takes this opportunity of suggesting to managers, the prudence of establishing among their staff of servants and attendants before and behind the curtain, some sort of regular system, according to which, each person so employed shall be told off to his appointed station in case of fire or alarm, so as to prevent hesitation or confusion on any such emergency, and to facilitate the safe and quiet departure of the audience from all parts of the house, by all available means of exit.

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Appendix, No. 6.

PAPERS handed in by Mr. *Charles Greaves*, 30 April 1877.

Appendix, No. 6.

EAST LONDON WATERWORKS COMPANY.

STATEMENT showing how long on the occasion of FIRES happening in the EAST LONDON COMPANY'S DISTRICT in 1874 the COMPANY'S PLUGS were drawn.

Time Plug out.	No. of Fires.		Time Plug out.	No. of Fires.	
H. M.			H. M.		
Under - - 0 30	128		Over and - 14 30	1	1 Plug extra and 1 Standpipe.
Over and - 0 30	18	2 Plugs extra.			
„ - 1 0	22	3 Standpipes.	„ - 17 30	1	1 Plug extra and 1 Standpipe.
„ - 1 30	11	4 Plugs extra and 1 Standpipe.	„ - 20 30	1	3 Plugs extra and 1 Standpipe.
„ - 2 0	9	2 Plugs extra.			
„ - 2 30	6	4 Plugs extra.	„ - 23 0	1	4 Plugs extra.
„ - 3 0	3	2 Plugs extra.	„ - 23 30	1	2 Plugs extra and 1 Standpipe.
„ - 3 30	4	4 Plugs extra and 1 Standpipe.	„ - 29 30	1	5 Plugs extra and 1 Standpipe.
„ - 4 0	2	3 Plugs extra.			
„ - 4 30	1	1 Plug extra.	„ - 50 0	1	1 Standpipe.
„ - 5 0	4	5 Plugs extra and Standpipe.	„ - 54 0	1	6 Plugs extra and 1 Standpipe.
„ - 5 30	1		„ - 128 0	1	7 Plugs extra and 1 Standpipe.
„ - 6 0	1	1 Plug extra.			
„ - 7 0	1	1 Plug extra.	No Plug started -	42	
„ - 8 0	1		Water used from hydrant, butt, cistern, tank, or river -	29	
„ - 8 30	1	2 Plugs extra.			
„ - 10 0	1	1 Plug extra.		295	Total Number of Fires.
„ - 11 30	1	2 Plugs extra and 1 Standpipe.			

YEAR 1875.

TABLE showing Duration of FIRE, Time Plug was drawn, or Standpipe in.

H. M.	H. M.	Number.
—	Under 0 30 - -	76
30	and under 1 0 - -	84
1 0 „	„ 1 30 - -	14
1 30 „	„ 2 0 - -	7
2 0 „	„ 2 30 - -	8
2 30 „	„ 3 0 - -	3
3 0 „	„ 3 30 - -	1
3 30 „	„ 4 0 - -	—
4 0 „	„ 4 30 - -	1
4 30 „	„ 5 0 - -	1
5 0 „	„ 5 30 - -	3
5 30 „	„ 6 0 - -	—
6 0 „	„ 6 30 - -	3
6 30 „	„ 7 0 - -	1
7 0 „	„ 7 30 - -	1
7 30 „	„ 8 0 - -	1
8 0 „	„ 8 30 - -	2
8 30 „	„ 9 0 - -	—
	12 0 - -	1
	13 0 - -	1
	14 0 - -	1
	15 0 - -	1
	24 0 - -	1
	26 0 - -	1
	36 0 - -	1
No Water required, used from cistern.		90
Not stated how long plug was drawn.		3
	TOTAL - -	256

YEAR 1876.

TABLE showing Duration of FIRE, Time Plug was drawn, or Standpipe in.

H. M.	H. M.	Number.
—	Under 0 30 - -	65
30	and under 1 0 - -	83
1 0 „	„ 1 30 - -	26
1 30 „	„ 2 0 - -	11
2 0 „	„ 2 30 - -	13
2 30 „	„ 3 0 - -	—
3 0 „	„ 3 30 - -	5
3 30 „	„ 4 0 - -	3
4 0 „	„ 4 30 - -	—
4 30 „	„ 5 0 - -	—
5 0 „	„ 5 30 - -	4
5 30 „	„ 6 0 - -	—
6 0 „	„ 6 30 - -	1
6 30 „	„ 7 0 - -	—
7 0 „	„ 7 30 - -	1
7 30 „	„ 8 0 - -	1
8 0 „	„ 8 30 - -	1
	9 0 - -	1
	10 0 - -	1
	12 0 - -	1
	18 0 - -	1
	96 0 - -	1
No water required, used from cistern, &c.		121
Not stated how long plug was drawn.		1
Supply disconnected, no main near		1
	TOTAL - -	292

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Appendix, No. 6.

EAST LONDON WATERWORKS COMPANY.

STATEMENT as to FIRES in the EAST LONDON DISTRICT, showing whether TURNCOCK or BRIGADE arrived first.

In the Year	TURNCOCK FIRST.		BRIGADE FIRST.	
	Number of Fires.	Minutes in Advance.	Number of Fires.	Minutes in Advance.
		M. S.		M. S.
1868	162	11 45	59	6 35
1869	123	9 34	79	6 37
1870	145	7 47	78	5 42
1871	131	7 0	68	5 29
1872	89	10 10	52	5 34
1873	84	8 27	104	5 52
1874	74	8 12	90	5 34

SUMMARY of TURNCOCKS' and BRIGADES' Arrival at FIRES—Seven Years.

1868. Fire Brigade arrived before Turncock - - - 59 times.
Average time, 6m. 35s.
Turncock arrived before Brigade - - - - 162 „
Average time, 11m. 45s.

1869. Fire Brigade arrived before Turncock - - - 79 times
Average time, 6m. 37s.
Turncock arrived before Brigade - - - - 123 „
Average time, 9m. 34s.

1870. Fire Brigade arrived before Turncock - - - 78 times.
Average time, 5m. 42s.
Turncock arrived before Brigade - - - - 145 „
Average time, 7m. 47s.
Equal - - 101 „
No engine - 1 „
Water not required or drawn from hydrant, butt, cistern, dock, or river - - - - 22 „
West Ham - - 2 „
Reports imperfect - 29 „
378 „

1871. Fire Brigade arrived before Turncock - - - 68 times.
Average time, 5m. 29s.
Turncock arrived before Brigade - - - - 131 „
Average time, 7m. 0s.
Equal - - 97 „
West Ham - 2 „
Water not required or drawn from hydrant, butt, cistern, dock, or river - - - - 56 „
354 „

1872. Fire Brigade arrived before Turncock - - - 52 times.
Average time, 5m. 34s.
Turncock arrived before Brigade - - - - 89 „
Average time, 10m. 10s.
Equal - - 94 „
Water not required or drawn from hydrant, butt, cistern, dock, or river - - - - 25 „
Reports imperfect - 10 „
270 „

1873. Fire Brigade arrived before Turncock - - - 104 times.
Average time, 5m. 52s.
Turncock arrived before Brigade - - - - 84 „
Average time, 8m. 27s.
Equal - - 60 „
No engine - 3 „
Water not required or drawn from hydrant, butt, cistern, dock, or river - - - - 27 „
Reports imperfect - 15 „
293 „

1874. Fire Brigade arrived before Turncock - - - 90 times.
Average time, 5m. 34s.
Turncock arrived before Brigade - - - - 74 „
Average time, 8m. 12s.
Equal - - 45 „
No engine - 2 „
Water not required or drawn from hydrant, butt, cistern, dock, or river - - - - 70 „
Reports imperfect - 14 „
295 „

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Appendix, No. 6.

TOTAL NUMBER of FIRES for the Year 1875 - - 256.

	Number.
Turncock arrived first to Fires - - - - -	51
Brigade " " " - - - - - -	47
Brigade and Turncock arrived to Fires same time - -	44
Plugs started, but no time of Engine arrival given - -	24
No plug started; water used from cistern - - -	90
TOTAL - - -	256

TOTAL NUMBER OF FIRES for the Year 1876 - - 292.

	Number.
Turncock arrived first to Fires - - - - -	57
Brigade " " " - - - - - -	44
Brigade and Turncock arrived to Fires same time - -	35
Plugs started, but no time of Engine arrival given - -	33
Engine arrived, but no time of Turncock's arrival given -	2
No plug started; water used from cistern - - -	121
TOTAL - - -	292

NUMBER of FIRES at which—

YEAR.	Brigade arrived before Turncock.		Turncock arrived before Brigade.	
	Number.	Average Time.	Number.	Average Time.
		M. S.		M. S.
1868 - - - -	59	6 35	162	11 45
1869 - - - -	79	6 37	123	9 34
1870 - - - -	78	5 42	145	7 47
1871 - - - -	68	5 29	131	7 0
1872 - - - -	52	5 34	89	10 10
1873 - - - -	104	5 52	84	8 27
1874 - - - -	90	5 34	74	8 12
1875 - - - -	45	5 26	51	8 25
1876 - - - -	44	5 50	57	9 1_8
TOTAL of 9 Years - -	621	Average - 5 51	Total of 9 Years - 916	Average 8 57

HOURLY PER-CENTAGE of SUPPLY.—East London Waterworks.

DAY.		NIGHT.	
6 A.M to 7 - - -	4·56	6 P.M. to 7 - -	3·52
8 - - -	5·70	8 - -	3·61
9 - - -	5·40	9 - -	2·48
10 - - -	6·25 max.	10 - -	2·49
11 - - -	6·10	11 - -	2·34
Noon 12 - - -	6.02	Mid. 12 - -	2·40
P.M. 1 - - -	5·75	A.M. 1 - -	2·32 min.
2 - - -	5·40	2 - -	2·39
3 - - -	5·97	3 - -	2·47
4 - - -	5·06	4 - -	3·12
5 - - -	4·84	5 - -	3·35
6 - -	4·90	6 -	3·52

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Appendix, No. 7.

PAPER handed in by Mr. *C. Greaves.*

EAST LONDON WATER COMPANY.

Appendix, No. 7.

QUANTITY of FIRE PLUGS sent out Half-yearly to all the East London Waterworks District.

Half-year ending	Repairs.	New Works.	TOTAL.	Half-year ending	Repairs.	New Works.	TOTAL.
Christmas - 1859	866	75	941	Midsummer 1867	1,287	200	1,487
Midsummer 1860	1,027	46	1,073	Christmas - 1867	1,505	178	1,683
Christmas - 1860	869	68	937	Midsummer 1868	1,002	290	1,292
Midsummer 1861	1,715	87	1,802	Christmas - 1868	743	191	934
Christmas - 1861	975	68	1,043	Midsummer 1869	1,033	165	1,198
Midsummer 1862	606	54	660	Christmas - 1869	1,311	217	1,528
Christmas - 1862	1,031	105	1,136	Midsummer 1870	1,614	170	1,784
Midsummer 1863	966	199	1,165	Christmas - 1870	1,466	146	1,612
Christmas - 1863	1,159	239	1,398	Midsummer 1871	1,684	100	1,784
Midsummer 1864	665	162	827	Christmas - 1871	1,361	124	1,485
Christmas - 1864	1,184	225	1,409	Midsummer 1872	1,211	111	1,322
Midsummer 1865	627	205	832	Christmas - 1872	1,451	132	1,583
Christmas - 1865	1,020	199	1,219	Midsummer 1873	1,263	116	1,379
Midsummer 1866	847	188	1,035	Christmas - 1873	1,321	96	1,417
Christmas - 1866	1,518	277	1,795	Midsummer 1874	1,149	92	1,241
				Christmas - 1874	1,043	84	1,127

NUMBER of PLUG PIPES issued Yearly to all the East London Waterworks District.

1851 - - - - -		308
1852 - - - - -		465
1853 - - - - -		366
1854 - - - - -		582
1855 - - - - -		421
1856 - - - - -		330
1857 - - - - -		283
1858 - - - - -		195
1859 -	New work - - -	214
	Repairs - - -	42
1860 -	New work - - -	116
	Repairs - - -	30
1861 -	New work - - -	156
	Repairs - - -	45
1862 -	New work - - -	164
	Repairs - - -	21
1863 -	New work - - -	445
	Repairs - - -	17
1864 -	New work - - -	373
	Repairs - - -	32
1865 -	New work - - -	404
	Repairs - - -	29
1866 -	New work - - -	467
	Repairs - - -	21
1867 -	New work - - -	383
	Repairs - - -	25
1868 -	New work - - -	494
	Repairs - - -	31
1869 -	New work - - -	381
	Repairs - - -	31
1870 -	New work - - -	315
	Repairs - - -	36
1871 -	New work - - -	229
	Repairs - - -	21
1872 -	New work - - -	248
	Repairs - - -	26
1873 -	New work - - -	210
	Repairs - - -	9
1874 -	New work - - -	177
	Repairs - - -	18

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Appendix, No. 7.

EAST LONDON WATER WORKS COMPANY—*continued.*

GALLONS per Minute.—East London Waterworks District.—15th and 16th June 1875.

	Per Cent.	Gallons per Minute.		Per Cent.	Gallons per Minute.
6 to 7 a.m. - -	5·45	24,616	8 p.m. - -	3·50	15,793
8 „ - -	6·52	29,446	9 „ - -	2·45	11,062
9 „ - -	6·31	28,470	10 „ - -	2·45	11,056
10 „ - -	6·44	29,066	11 „ - -	2·35	10,616
11 „ - -	6·99	31,538	12 midnight -	·3	10,409
12 noon -	5·98	26,996	1 a.m. - -	2·33	10,528
1 p.m. -	5·25	29,684	2 „ - -	2·23	10,066
2 „ - -	5·13	23,177	3 „ - -	2·30	10,393
3 „ - -	5·43	24,500	4 „ - -	3·22	14,532
4 „ - -	5·26	23,733	5 „ - -	3·05	13,786
5 „ - -	4·60	20,769	6 „ - -	3·03	13,930
6 „ - -	4·03	18,218	Average -		12,720
7 „ - -	3·22	14,565			

		Gallons.
Old Ford - - - - - - - - -	Total	9,724,997
Lea Bridge - - - - - - - - -	„	9,000,206
Prince and Princess - - - - - - -	„	5,077,450
Sunbury - - - - - - - - -	„	3,255,162
		27,057,815

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Appendix, No. 8.

PAPER handed in by Mr. *C. Greaves.*

KENT WATER COMPANY.

Height of Ground above Ordnance Datum at Point of Observation.	At the several Points of Observation thus Numbered.	Pressure in lbs. per Square Inch, according to Sir J. W. Bazalgette's Tabular Statement.	Height in Feet to which Water may be presumed to Rise.
	1	45 to 55	103·95 to 127·05
	2	60 „ 65	138·6 „ 150·15
	3	40 „ 50	92·4 „ 115·5
	4	51 „ 56	117·81 „ 129·36
	5	46 „ 50	106·26 „ 115·5
	6	44 „ 45	101·64 „ 103·95
	7	50 „ 55 and 60	115·5 „ 127·05 and 138·6
	8	39 to 41	90·09 to 94·71
	9	30 „ 35	69·3 „ 80·85
	10	28	64·68
20 feet	11	31	71·61
	12	51 to 57	117·81 to 131·67
	13	26 „ 38	60·06 „ 87·78
	14	51 „ 55	117·81 „ 127·05
	15	42	97·02
	16	39	90·09
	17	17	39·27
	18	20	46·2
	19	60	138·6
	20	61	140·91
	21	60	138·6
	22	62	143·22
	23	18 to 10	41·58 to 23·1
	24	50	115·5
	25	44 to 45	101·64 to 103·95
	26	17	39·27
	27	44 to 45	101·64 to 103·95
	28	55	127·05
	29	48 to 54	110·88 to 124·74
	30	50	115·5
	31	38 to 42	87·78 to 97·02
40 feet	32	54 „ 58	124·74 „ 133·98
	33	60 „ 70	138·6 „ 161·7
	34	40 „ 45	92·4 „ 103·95
	35	58 „ 62	133·98 „ 143·22
	36	24	55·44
	37	39	90·09
	38	58 to 62	133·98 to 143·22
	39	55 „ 60	127·05 „ 138·6
	40	44 „ 54	101·64 „ 124·74
	41	45	103·95
	42	55	127·05
	43	51	117·81
	44	55 to 60	127·05 to 138·6
	45	87	200·97
	46	18	41·58
	47	17 to 18	39·27 to 41·58
60 feet	48	5	11·55
	49	48	110·88
	50	60 to 70	138·6 to 161·7
	51	39 „ 48	90·09 „ 110·88
	52	42 „ 52	97·02 „ 120·12
	53	55 to 65	127·05 to 150·15
	54	68 „ 67	157·08 „ 154·77
80 feet	55	48 „ 50	110·88 „ 115·5
	56	14 „ 16	32·34 „ 36·96
	57	32	73·92
	58	44	101·64
	59	34	78·54
100 feet	60	50	115·5
	61	65 to 78	150·15 to 180·18
	62	50	115·5
	63	47 to 50	108·57 to 115·5
	64	35 „ 55	80·85 „ 127·05
	65	28 „ 35	64·68 „ 80·85
150 feet	66	25 „ 35	57·75 „ 80·85
	67	35 „ 40	80·85 „ 92·4
	68	33	76·23
	69	33 to 35	76·23 to 80·85
	70	33	76·23
	71	28	64·68
	72	29	66·99
	73	12	27·72
	74	27	62·37
	75	26	60·06
200 feet	76	27	62·37
	77	30	69·3
	78	33	76·23
	79	31	71·61
	80	42	97·02
250 feet	81	30	69·3

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SOUTHWARK AND VAUXHALL WATER COMPANY.

Height of Ground above Ordnance Datum at Point of Observation.	At the several Points of Observation thus Numbered.	Pressure in lbs. per Square Inch, according to Sir J. W. Bazalgette's Tabular Statement.	Height in Feet to which Water may be presumed to Rise.
20 feet	1	40	92·4
	2	42 to 44	97·02 to 101·64
	3	32	73·92
	4	16	36·96
	5	25	57·75
	6	43	99·33
	7	42	97·02
	8	48	110·88
	9	22 to 24	50·82 to 55·44
	10	22 „ 24	50·82 „ 55·44
	11	19	43·89
	12	4	9·24
	13	14	32·24
	14	10	23·1
	15	36	83·16
	16	37 to 39	85·47 to 90·09
	17	25 „ 35	57·75 „ 80·85
	18	20	46·2
	19	35 to 45	80·85 to 103·95
	20	36	83·16
40 feet	21	25	57·75
	22	14	32·34
	23	35 to 42	80·85 to 97·02
	24	24 „ 28	55·44 „ 64·68
40 feet	25	35 to 45	80·85 to 103·95
	26	26 „ 36	60·06 „ 83·16
	27	4	9·24
	28	35 to 45	80·85 to 103·95
	29	40 „ 50	92·4 „ 115·5
	30	35 „ 50	80·85 „ 115·5
	31	15	34·65
	32	13	30·03
60 feet	33	12 to 24	27·72 to 55·44
	34	20 „ 25	46·2 „ 57·75
	35	12 „ 24	27·72 „ 55·44
	36	25 „ 35	57·75 „ 80·85
	37	20	46·2
	38	2	4·62
	39	6	13·86
80 feet	40	30	69·3
	41	12 to 18	27·72 to 41·58
100 feet	42	16	36·96
	43	20 to 25	46·2 to 57·75
150 feet	44	4	9·24
	45	15 to 10	34·65 to 23·1

LAMBETH WATER COMPANY.

Height of Ground above Ordnance Datum at Point of Observation.	At the several Points of Observation thus Numbered.	Pressure in lbs. per Square Inch, according to Sir J. W. Bazalgette's Tabular Statement.	Height in Feet to which Water may be presumed to Rise.
20 feet	1	65 to 80	150·15 to 184·8
	2	34	78·54
	3	24	55·44
	4	22	50·82
	5	34	78·54
	6	20 to 22	46·2 to 50·82
	7	20	46·2
	8	28	64·68
	9	26	60·06
	10	20	46·2
	11	25	57·75
	12	24	55·44
	13	26	60·06
	14	12	27·72
	15	29	66·99
	16	28	64·68
	17	35	80·85
	18	40	92·4
	19	40	92·4
	20	32	73·92
	21	28	64·68
	22	36	83·16
40 feet	23	11	25·41
	24	16	36·96
	25	13	30·03
	26	15	34·65
	27	18	41·58
60 feet	28	15	34·65
	29	120 to 123	277·20 to 284·13
	30	8	18·48
	31	118 to 120	272·58 to 277·20
	32	52	120·12
80 feet	33	130 to 140	300·3 to 323·4
	34	30 „ 40	69·3 „ 92·4
100 feet	35	15	34·65
	36	88	203·28
	37	110 to 112	254·1 to 258·72
	38	84	194·04
	39	76	175·56
	40	85	196·35
	41	32	73·92
	42	30	69·3
	43	26	60·06
	44	24	55·44
	45	36	83·16
	46	37	85·47
	47	29	66·99
	48	26	60·06
	49	27	62·37
	50	38	87·78
	51	28	64·68
	52	26	60·06
	53	35	80·85
	54	30	69·3
	55	21	48·51
	56	60 to 70	138·6 to 161·7
	57	40	92·4
	58	25	57·75
	59	48	110·88
	60	49	113·19
	61	42	97·02

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LAMBETH WATER COMPANY—*continued.*

Height of Ground above Ordnance Datum at Point of Observation.	At the several Points of Observation thus Numbered.	Pressure in lbs. per Square Inch, according to Sir J. W. Bazalgette's Tabular Statement.	Height in Feet to which Water may be presumed to Rise.
150 feet -	62	12	27·72
	63	32	73·92
	64	5	11·55
	65	53	122·43
	66	72	166·32
	67	16	36·96
	68	18	41·58
	69	37	85·47
	70	7	16·17
	71	28	64·68
200 feet -	72	3	6·93
	73	7	16·17
	74	70 to 75	161·7 to 173·25
	75	79 „ 81	182·49 „ 187·11
	76	69 „ 71	159·39 „ 164·01
	77	5	11·55
	78	½	1·15
200 feet -	79	78	180·18
	80	55	127·05
	81	7	16·17
	82	30	69·3
	83	6	13·86
250 feet -	84	50 to 57	115·5 to 131·67
	85	38 „ 40	87·78 „ 92·4
	86	52	120·12
300 feet -	87	30 to 58	69·3 to 133·98
	88	47	108·57
350 feet -	89	5	11·55
	90	38	87·78
	91	23	53·13
	92	15	34·65
	93	5	11·55
	94	12	27·72

NEW RIVER WATER COMPANY.

40 feet -	1	10	23·1
	2	33 to 32	76·23 to 73·92
	3	31	71·61
60 feet -	4	28	64·68
	5	32	73·92
	6	25	57·75
	7	31	71·61
	8	33	76·23
	9	35	80·85
	10	31	71·61
	11	35	80·85
	12	28	64·68
	13	33	76·23
	14	23	53·13
	15	36	83·16
	16	28	64·68
	17	26 to 25	60·06 to 57·75
	18	19	43·89
	19	44 to 55	101·64 to 127·05
	20	54 „ 56	124·74 „ 129·36
	21	24	55·44
	22	25	57·75
	23	45 to 39	103·95 to 90·09
	24	20	46·2
80 feet -	25	53	122·43
	26	40 to 41	92·4 to 94·71
	27	29 „ 32	66·99 „ 73·92
	28	24	55·44
	29	51	117·81
	30	28	64·68
80 feet -	31	7	16·17
	32	29	66·99
	33	25	57·75
	34	34	78·54
	35	16	36·96
	36	25	57·75
	37	42 to 48	97·02 to 110·88
	38	45 „ 50	103·95 „ 115·5
	39	51	117·81
	40	15	34·65
	41	31 to 33	71·61 to 76·23
	42	27 „ 32	85·47 „ 73·92
100 feet	43	35	80·85
	44	39	90·09
	45	30	69·3
	46	28 to 30	64·68 to 69·3
	47	55 „ 58	127·05 „ 133·98
	48	48 „ 52	110·88 „ 120·12
	49	38 „ 40	87·78 „ 92·4
	50	45	103·95
	51	44 to 45	101·64 to 103·95
	52	45	103·95
	53	43	99·33
	54	45	103·95
	55	36	83·16
	56	32	73·92
	57	40	92·4
	58	40 to 44	92·4 to 101·64
150 feet -	59	23	53·13
	60	25	57·75

GRAND JUNCTION WATER COMPANY.

20 feet -	1	14½	33·49
	2	37	85·47
	3	43	99·33
	4	27	62·37
	5	50	115·5
	6	30 to 31	69·3 to 71·61
40 feet -	7	41	94·71
	8	34½	79·69
	9	39	90·09
	10	44	101·64
	11	37	85·47
60 feet -	12	27	62·37
	13	50	115·5
	14	30 to 40	69·3 to 92·4
	15	12 „ 16	27·72 „ 36·96
	16	24 „ 26 Feet. / 16 „ 17 Feet.	55·44 „ 60·06 / 36·96 „ 39·27
80 feet -	17	17½	40·42
	18	32 to 25	73·92 to 57·75
	19	25 „ 28	57·75 „ 64·68
	20	24	55·44
	21	23	53·13

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GRAND JUNCTION WATER COMPANY—*continued.*

Height of Ground above Ordnance Datum at Point of Observation.	At the several Points of Observation thus Numbered.	Pressure in lbs. per Square Inch, according to Sir J. W. Bazalgette's Tabular Statement.	Height in Feet to which Water may be presumed to Rise.	Height of Ground above Ordnance Datum at Point of Observation.	At the several Points of Observation thus Numbered.	Pressure in lbs. per Square Inch, according to Sir J. W. Bazalgette's Tabular Statement.	Height in Feet to which Water may be presumed to Rise.
80 feet	22	29	66·99	100 feet	35	37	85·47
	23	22	50·82		36	21 to 23	48·51 to 53·13
	24	17	39·27		37	49 „ 51	113·19 „ 117·81
	25	15	34·65		38	25 „ 27	57·75 „ 62·37
	26	40 to 47	92·4 to 108·57		39	43 „ 54	99·33 „ 124·74
	27	24 „ 25	55·44 „ 57·75		40	25	57·75
	28	23 „	53·13		41	41 to 45	94·71 to 103·95
	29	17	39·27		42	33	76·23
	30	17 to 19	39·27 to 43·89		43	22 to 23	50·82 to 53·13
	31	24 „ 26	55·44 „ 60·06		44	24 „ 25	55·44 „ 57·75
	32	24 „ 26	55·44 „ 60·06				
	33	17 „ 18	39·27 „ 41·58	150 feet	45	5	11·55
	34	17 „ 18	39·27 „ 41·58		46	20 to 23	46·2 to 53·13

WEST MIDDLESEX WATER COMPANY.

20 feet	1	40	92·4	80 feet	12	29 to 32	66·99 to 73·92
	2	42	97·02		13	25 „ 26	57·75 „ 60·06
	3	35	80·85		14	31 „ 34	71·61 „ 78·54
	4	12	27·72		15	24 „ 26	55·44 „ 60·06
					16	17	39·27
40 feet	5	33	76·23		17	21	48·51
	6	23	53·13		18	11 to 12	25·41 to 27·72
	7	28	64·68		19	29	66·99
	8	50	115·5		20	17 to 18	39·27 to 41·58
	9	37	85·47	100 feet	21	25 „ 27	57·75 „ 62·37
					22	15 „ 25	34·65 „ 57·75
					23	25	57·75
60 feet	10	35 to 38	80·85 to 87·78		24	20	69·3
	11	37	85·47		25	20 to 22	46·2 to 50·82

CHELSEA WATER COMPANY.

20 feet	1	25	57·75	20 feet	9	35 to 33	80·85 to 76·23
	2	33 to 32	76·23 to 73·92		10	38 „ 39	87·78 „ 90·09
	3	30	69·3		11	38	76·23
	4	26	60·06		12	40 to 41	92·4 to 94·71
	5	54 to 55	124·74 to 127·05		13	38	87·78
	6	37	85·47				
	7	25	57·75				
	8	27	62·37	40 feet	14	25	57·75

EAST LONDON WATER COMPANY.

20 feet	1	16	36·96	40 feet	21	18 to 23	41·58 to 53·13
	2	12 to 18	27·72 to 30·03		22	20	46·2
	3	16 „ 18	36·96 „ 41·58		23	23	53·13
	4	18 „ 20	41·58 „ 46·2		24	22	50·82
	5	22 „ 25	50·82 „ 57·75		25	20	46·2
	6	22	50·82		26	23	53·13
	7	16	36·96		27	21 to 23	48·51 to 53·13
	8	16 to 17	36·96 to 39·27		28	18 „ 22	41·58 „ 50·82
	9	22	50·82		29	5 „ 35	11·55 „ 80·85
	10	25	57·75		30	18 „ 22	41·58 „ 50·82
	11	15	34·65		31	14	32·34
	12	10 to 20	23·1 to 46·2		32	18	41·58
	13	30	69·3		33	15	34·65
	14	20 to 30	46·2 to 69·3		34	14	32·34
	15	15 „ 25	34·65 „ 57·75		35	20	46·2
	16	30 „ 40	69·3 „ 92·4		36	16 to 19	36·96 to 43·89
	17	25 „ 35	57·75 „ 80·85		37	22 „ 25	50·82 „ 57·75
	18	15 „ 20	34·65 „ 46·2				
	19	22	50·82	60 feet	38	8	18·48
	20	28	64·68		39	10	23·1

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Appendix, No 9.

WEST MIDDLESEX WATER WORKS COMPANY'S DISTRICT.

READINGS of PRESSURE GAUGE taken during the DAY, June 1876.

Time.	Pressure in Feet.	Level of the Ground above Ordnance Datum.	Place or Main.	Time.	Pressure in Feet.	Level of the Ground above Ordnance Datum.	Place or Main.
6.0 a.m	134	17	Broadway, Hammersmith.	12.15 p.m.	64	123	Hamilton-terrace.
6.15 „	164	17	Bradmore, Hammersmith.	12.30 „	82	104	Maida Vale, opposite 75.
6.30 „	114	51	Exhibition-road, Kensington.	12.45 „	75	26	Pembroke-square.
6.45 „	52	121	Brondesbury-road.	1.0 „	128	247	Finchley-road, by "Cock and Hoop."
7.0 „	46	123	Quex-road, Kilburn.				
7.15 „	64	51	Palace Gate Hotel.	1.15 „	89	26	Steven's Muse, Earl's Court.
7.30 „	49	29	Brompton-road.	1.30 „	144	19	Priam-place, Shepherd's Bush.
7.45 „	119	128	Kilburn, by Willesden-lane.	1.45 „	74	20	Addison-crescent.
8.0	94	14	The Grove, Hammersmith.	2.0 „	50	120	Belsize-road, by Nursery.
8 15 „	157	158	Edgware-road, by Shootup-hill.	2.15 „	124	67	Notting Hill-terrace.
„				2.30 „	168	19	The Grange, Shepherd's Bush.
8.30 „	128	198	Top of Shootup-hill.	2.45 „	99	30	Holland Park.
8.45 „	89	26	Hereford-square.	3.0 „	84	90	Office, Marylebone-road.
9.0 „	65	90	Office, Marylebone-road.	3.15 „	64	84	Ladbrooke-terrace.
9.15 „	69	25	Harrington-road.	3.30 „	51	131	West End-lane, by Abbott's-road.
9.30 „	139	166	Cricklewood, by "Windmill."				
9.45 „	64	16	Queen-street, Hammersmith.	3.45 „	94	91	Linden Grove.
10.0 „	54	27	Collingham-place.	4.0 „	145	167	West End-lane, by Oaklands Hall.
10.15 „	135	162	By "Crown," Cricklewood.				
10.30 „	149	15	Mall-road, Hammersmith.	4.15 „	157	50	Kensington Gardens.
10.45 „	69	26	Earl's Court-square.	4.30 „	55	117	Upton-road, Kilburn.
11.0 „	74	90	Office, Marylebone-road.	4.45 „	104	75	Queen's-road, Bayswater.
11.15 „	44	287	Burgess-hill.	5.0 „	83	108	Station-road, Kilburn.
11.30 „	64	25	Cromwell-road, West.	5.15 „	154	17	Portland-place, North End.
11.45 „	76	89	Marylebone-road, by Glo'ster-road.	5.30 „	56	121	Prospect-place, Kilburn.
				5.45 „	94	67	Westbourne Villas.
12.0 noon	172	16	Ravenscourt Park.	6.0 „	195	19	Hammersmith Works.

READINGS of PRESSURE GAUGE taken during the NIGHT, June 1876.

6.0 p.m.	69	98	Jonson-place, Harrow-road.	12.30 a.m.	144	13	Lillie-road, Fulham.
6.15 „	144	16	North End, Fulham.	12.45 „	84	102	Albany-street, by Ernest-street.
6.30 „	76	100	Office, Kensington Reservoir.				
6.45 „	164	14	May-street, Fulham.	1.0 „	164	26	Marloes-road, Kensington.
7.0 „	74	90	Carlton Bridge, Harrow-road.	1.15 „	144	17	Diepe-street, North End.
				1.30 „	63	125	Abbey-road, by Belsize-road.
7.15 „	61	139	St. Julian's-road, Kilburn.	1.45 „	153	167	West End-lane, by Oakland-hall.
7.30 „	164	13	Lillie road, Fulham.				
7.45 „	124	195	Mill-lane, West End.	2.0 „	169	27	Courtfield Gardens.
8.0 „	100	90	Office, Marylebone-road.	2.15 „	73	117	Upton-road, Kilburn.
8.15 „	148	46	Ennismore Gardens.	2.30 „	179	19	Blythe-lane, Hammersmith.
8.30 „	174	16	King-street West, Hammersmith.	2.45 „	82	100	Office, Kensington Reservoir.
				3.0 „	179	19	Roseford-terrace, Shepherd's Bush.
8.45 „	148	48	Princes Gate, Kensington.				
9.0 „	86	108	Edgware-road, by Earls street.	3.15 „	129	14	Napier-road, Kensington.
9.15 „	174	17	Overston-road, Bradmore.	3.30 „	151	17	Paddenwick-road, Hammersmith.
9.30 „	184	140	By Kilburn Brewery.				
9.45 „	164	17	Broadway, Hammersmith.	3.45 „	69	118	Grove-road, St. John's Wood.
10.0 „	106	90	Marylebone-road.	4.0 „	82	100	Office, Kennington Reservoir.
10.15 „	164	25	Stanhope Gardens.	4.15 „	100	90	Office, Marylebone-road.
10.30 „	108	85	Portman-square.	4.30 „	139	57	Essex Villas, Kensington.
10.45 „	174	18	Devon-terrace, Fulham-road.	4.45 „	84	100	Kensington Reservoir.
11.0 „	124	195	West End, Hampstead.	5.0 „	144	17	Broadway, Hammersmith.
11.15 „	106	86	Oxford street, by Rathbone-place.	5.15 „	61	129	Edgware-road, by "The Terrace," Kilburn.
11.30 „	168	19	"Crabtree," Fulham.	5.30 „	50	135	Abbey-road, St. John's Wood.
11.45 „	102	92	Tottenham Court-road, by Howland-street.	5.45 „	75	46	Ennismore Gardens.
12.0 night.	144	50	Church-court, Kensington.	6.0 „			
12.15 a.m.	120	202	Finchley-road, by North London Railway.				

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Appendix, No. 10.

PAPERS handed in by Mr. *Charles Few*, 10 May 1877.

CHELSEA WATERWORKS COMPANY.

Appendix, No. 10.

STATEMENT of the CHELSEA WATERWORKS COMPANY.

Name of Company	The Governor and Company of Chelsea Waterworks.	
Area of water supply within the metropolitan district	5 square miles.	
Total length of mains in such area	170 miles.	
Total length of mains in such area under constant pressure	56 miles.	
A map is herewith submitted, with such last-mentioned mains marked thereon.		
Height at which the Company can deliver water above the pavement, viz.:—		
From 6 a.m. to 6 p.m.	Minimum, 40 feet.	Maximum, 120 feet.
„ 6 p.m. to 6 a.m.	„ 120 „	„ 140 „
Number of houses supplied in the district	28,737.	
Number of fire-plugs in the district	4,000.	
Hydrants—		
For private use	Numerous.	
For public service	None.	
Number of reservoirs used for service within the metropolitan district	Three.	
Height of such reservoirs above Ordnance datum	185 feet.	
Capacities of such reservoirs	Eleven million gallons.	

RETURN of FIRES which occurred in the Company's District during the Three Years ending on the 25th day of March 1877.

	5 Minutes.	10 Minutes.	15 Minutes.	25 Minutes.
Three years, 243 fire calls:				
Water before 1st engine on 63 occasions	41	10	7	5
Engine before water on 26 occasions	19	6	1	—

Fire got under without the engines being used on 205 occasions.
Engines used on 38 „
243

The rewards paid by the Company to strangers for calling their turncocks to fires for the three years ended 25th March 1877, amounted to 37 *l.* 17 *s.* 6 *d.*

Albert Gill, Secretary.

7 May 1877.

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LAMBETH WATERWORKS COMPANY.

Appendix, No. 10.

STATEMENT of the LAMBETH WATERWORKS COMPANY.

Name of Company	The Company of Proprietors of Lambeth Waterworks.
Area of water supply within the Metropolitan District.	23 square miles.
Total length of mains in such area	About 100 miles.
Total length of mains in such area under constant pressure.	About 65 miles.
A map is herewith submitted, with such last-mentioned mains marked thereon.	
Height at which the Company can deliver water above the pavement, viz. :—	
From 6 a.m. to 6 p.m.	Minimum, 30 feet | Maximum, 80 feet.
From 6 p.m. to 6 a.m.	„ 50 „ | „ 120 „
Number of houses supplied in the district	42,000.
Number of fire-plugs in the district	About 8,000.
Hydrants—	
For private use	Numerous.
For public service	None.
Number of reservoirs used for service within the Metropolitan District.	Eight.
Height of such reservoirs above Ordnance datum	2 at Brixton Hill, 115 feet each. 2 „ Streatham - 197 „ 2 „ Rockhill, Sydenham, one 372 feet and the other 387 feet. 1 „ Norwood, 315 feet; 1 at Selhurst, 218 feet.
Capacities of such reservoirs	Brixton - - - 12,000,000 gallons. Streatham - - - 7,500,000 „ Rockhill - - - 615,000 „ Norwood - - - 5,000,000 „ Selhurst - - - 2,500,000 „ 27,615,000 „

RETURN of FIRES which occurred in the Company's District during the Three Years ending on the 31st day of March 1877.

220.

Turncocks called after fire broke out within—

	5 Minutes.	10 Minutes.	15 Minutes.	25 Minutes.	Beyond	
Three years to 31st March 1877, fire calls	101	62	19	23	15	220

Fire got under without the engines being used on 187 occasions.
Engines used on - - - - - - 33 „

220

I certify to the correctness of the above return.

7 May 1877.

John Taylor,
Engineer to the Lambeth Waterworks Company.

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Appendix, No. 10.

GRAND JUNCTION WATERWORKS COMPANY.

STATEMENT of the GRAND JUNCTION WATERWORKS COMPANY.

Name of Company - - - - - - -	Grand Junction Waterworks Company
Area of water supply within the Metropolitan District.	6 square miles.
Total length of mains in such area - - -	200 miles.
Total length of mains in such area under constant pressure.	41½ miles.
A map is herewith submitted, with such last-mentioned mains marked thereon.	
Height at which the Company can deliver water above the pavement, viz.:—	
From 6 a.m. to 6 p.m. - - - -	Minimum, 40 feet | Maximum, 80 feet.
„ 6 p.m. to 6 a.m. - - - -	„ 30 „ | „ 60 „
Number of houses supplied in the district - -	29,123.
Number of fire-plugs in the district - - -	About 3,800.
Hydrants—	
For private use - - - - - -	Numerous.
For public service - - - - -	None. Specially for fire purposes. 63 standposts for street-watering purposes, available for fire purposes only during the road watering season, and 43 other standposts for street-watering purposes, capable of being used all the year round for fire purposes. The whole 106 standposts are supplied from mains constantly charged.
Number of reservoirs used for service within the Metropolitan District.	Three reservoirs on Campden-hill, Kensington, in addition to the pumping station at Kew Bridge, with which they are in communication.
Height of such reservoirs above Ordnance datum	136 feet.
Capacities of such reservoirs - - - - -	Eighteen million gallons.

RETURN of FIRES which occurred in the Company's District during the three years ending on the 31st day of March 1877.

	5 Minutes.	10 Minutes.	15 Minutes.	25 Minutes.
Three years, 250 fire calls.				
Water before first engine on 229 occasions - - -	205	12	8	4
Engine before water on 21 „ - - -	17	3	1	–
250				
Trifling alarms of fire 49 chimneys.				
299				

Fire got under without the engines being used on 209 occasions.
Engines used on - - - - - - 41 „
250

During the three years ending 25th day of March 1877 the Company have paid 30 *l.* 19 *s.* as rewards to strangers for calling their turncocks to alarms of fires.

7 May 1877.

Alexander Fraser,
Engineer to the Grand Junction Waterworks Company.

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Appendix, No. 10.

SOUTHWARK AND VAUXHALL WATER COMPANY.

STATEMENT of the SOUTHWARK and VAUXHALL WATER COMPANY.

Name of Company	Southwark and Vauxhall Water Company.
Area of water supply within the Metropolitan District.	20 square miles.
Total length of mains in such area	500 miles.
Total length of mains in such area under constant pressure.	112½ „
A map is herewith submitted, with such last-mentioned mains marked thereon.	
Height at which the Company can deliver water above the pavement, viz.:	
From 6 a.m. to 6 p.m.	Minimum, 50 feet | Maximum, 70 feet.
From 6 p.m to 6 a.m.	„ 70 „ | „ 150 „
Number of houses supplied in the district	77,880, of which about 60,000 are within the Metropolitan District.
Number of fire plugs in the district	33,000.
Hydrants:	
For private use	Numerous.
For public service	None specially for fire purpose; 50 for street watering, occasionally used for fire purposes, and 150 stand-posts capable of being used for like purposes.
Number of reservoirs used for service within the Metropolitan District.	Six in use, and four in course of construction.
Height of such reservoirs above ordnance datum	The six in use are severally above ordnance datum. The four under construction about 200 feet above ordnance datum.
Capacities of such reservoirs	Those in use 66,000,000 gallons. Those in construction, 20,000,000.

RETURN of FIRES which occurred in the Company's District during the Two Years and Eight Months ending on the 30th day of April 1877.

265.

	5 Minutes.	10 Minutes.	15 Minutes.	25 Minutes.
Two years and eight months, 265 fire calls. Water before first engine on 263 occasions Engine before water on 2 „ Trifling alarms of fire 51	No reliable records.			

Fire got under without the engines being used on 188 occasions.
Engines used on 77 „

265

During the three years ending 31st March 1877, the Company have paid 64 *l.* 13 *s.* as rewards to strangers for calling their turncocks to alarms of fire.

7 May 1877.

T. W. Rumble,
Chief Engineer to the Southwark and Vauxhall Water Company

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Appendix, No. 11.

PAPERS handed in by Mr. *Greaves*.

Appendix, No. 11. CORRESPONDENCE between the EAST LONDON WATERWORKS COMPANY and the METROPOLITAN BOARD OF WORKS.

East London Waterworks Company,
Sir, 16, St. Helen's-place, 17 December 1872.

I AM instructed by the directors of this company to call the attention of the Metropolitan Board of Works to the important subject of the supply of water at fires.

It has been very generally assumed that the absence of a constant supply of water for use by the public authorities, and by private individuals, on the occasion of fires, was much to be regretted, and was the not infrequent cause of extended mischief; at the same time, it is abundantly clear that while the above assumption has been generally made, and blame imputed to this and the other metropolitan water companies (with how much justice I will not stop to inquire) because constant supply was not given, provision has not been made by the public authorities for utilising, to anything like the full extent, the water supply as it has existed.

Previous to the passing of the Metropolitan Fire Brigade Act, 1865, so scattered were the duties which rested in this company's district upon local bodies and officers respecting fire-plugs, &c., that there could be no surprise if there were omission by such bodies and officers to bring about the best arrangements capable of being made by and with the company as to the supply of water for fires; but since all the powers of those local bodies and officers were by the above Act carried over to, and concentrated in, the Metropolitan Board of Works, and with them, as the directors submit, the duty of exercising them, the directors of this company have certainly felt it hard that their proprietors should still be left to bear a considerable annual expense in maintaining a system of fire-plugs, &c., which appears to satisfy no one; for which, instead of receiving any thanks or repayment, the company is blamed (although they are mere water purveyors, and can have nothing to do with the machinery for utilising their supply when it has left their mains or services), and towards the remedy of which no one seems inclined to move.

Nevertheless, it is quite true that during the six years which intervened between the passing of the Act of 1865 and the discussion on the subject before the Committee on the Metropolis Water Bill in 1871, no single application was made to the company by way of inquiry, or of seeking co-operation or otherwise, with a view to the remedy of that which was, during all that period, the subject of adverse comment in the district and elsewhere.

It was at the instance of the metropolitan water companies that the 34th section of the Metropolis Water Act, 1871, was enacted, and through its operation a better meaning has been given to the 32nd section of the Metropolitan Fire Brigade Act, 1865, and each of the water companies is enabled, on giving a constant supply in any part of its water limits, to enforce, at the expense of the Metropolitan Board of Works, an improved and satisfactory system of hydrants and other apparatus for use in case of fire.

The Act of 1871 has now been more than a year in force, but there have been the same silence and inaction as I have referred to in the six preceding years. Although, therefore, this company is not in any degree desirous of taking adverse action under the Act, the directors think it right to ask the attention of your Board to the subject, and to submit the information which follows.

The directors are advised that it would be found the wisest and best course, unless in exceptional cases, to place the fire hydrants, &c., on the companies' mains (that is to say, on those pipes which are carriers only), in preference to placing them on the "service pipes" (that is to say, the embranchments by which the water is led off to groups of houses, and out of which the "communication pipes" carry the water to the individual consumers).

Now, of those "mains" there are within the company's limits at least 150 miles, laid in at least 100 miles of public streets and roads (sometimes one main and sometimes more in the same street or road), and in which the water is, and for many years past has been, in constant supply under pressure. To this full extent, therefore, there may now be, and there might for several years past have been, placed any proper hydrants and other apparatus which the public authority in charge of this duty might desire and might adjust with the company.

But, although the directors entertain a strong preference on public and other grounds for the

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the placing of fire hydrants on the "mains," they are aware that the placing of them on the "service pipes" has, in some quarters, at least, been considered the better practice, and I am, therefore, to add that for several years past there have been within the company's limits very many miles of service-pipes in which the water has been in constant supply under pressure.

This mileage has been continuously increasing, and now amounts to more than 50 miles of service-pipes of five inches diameter and under. Here, then, again, if to deal with the "service-pipes" is the right practice, there has been, and is, a vast opportunity of bringing into operation improved apparatus in substitution for that which is assumed to be so faulty and so much less deserving of approval.

I am to add that, making this communication in the sincere desire of promoting improvement, and not merely of removing from this company a cause of expense to themselves and of dissatisfaction to others, the directors and their officers will be found most ready to give every further explanation and information which may assist the Board of Works in the exercise of the powers and performance of the duties imposed on them in connection with this important subject.

I am, &c.

Mr. J. E. Wakefield, (signed) *E. Bates*, Secretary.
Clerk, Metropolitan Board of Works.

HYDRANTS.

Metropolitan Board of Works, Spring Gardens,
18 December 1872.

Sir,

I BEG to acknowledge the receipt of your letter of the 17th inst., and to inform you that it will be laid before the Board.

I am, &c.
(signed) *J. E. Wakefield*,
Clerk of the Board

E. Bates, Esq.

METROPOLITAN WATER SUPPLY.

East London Waterworks Company, 16, St. Helen's Place,
Bishopsgate, 31 December 1873.

Sir,

I AM instructed by the directors of this company to ask that the facts and remarks which follow may be brought under the notice of the Metropolitan Board of Works.

In November 1872 this company, desiring to give effect, so far as lay in their power, to the Metropolis Water Act, 1871, and to make compliance with the public wish for "constant supply," gave notice to your Board that it was their intention to bring under constant supply on and from the 25th March 1873, a considerable portion (comprising upwards of 6,000 houses) of their district in Bethnal Green and Shoreditch. This initiative measure was not taken by the company until considerably after the passing of the Act of 1871, and the framing by Lord Methuen and his colleagues, of the necessary "regulations." Neither had the company omitted to prepare the district for the impending change, by the free circulation in it of information as to the terms of the Act and regulations.

The spirit of these publications may be inferred from the following extract from one of them:—

> "The block" (or area, intended first to be brought under constant supply) "contains 6,273 houses or thereabouts, and it is the intention of the company, with as little delay as possible, to deal in the same manner with other parts of their district.
>
> "It is assumed by the Legislature and the public that the change thus to be effected will confer great benefit on the consumers, and the company desire to facilitate and expedite it, but, in order to secure it, owners and occupiers must be prepared on their side to adapt their fittings or to have them adapted to the new state of things. This is alike necessary for protecting premises from damage and for preventing waste of the company's water, and the company will have no alternative but to insist on the necessary changes before the public wish for constant supply can be fulfilled.
>
> "Before the supply is made constant, every owner and occupier will, in the manner pointed out by the Act, receive notice requiring him to furnish his premises with the fittings prescribed by the regulations, and will be bound to do so within two months after such notice."

These introductory measures were felt to be necessary, because although it had been very confidently asserted by those who advocated the introduction of "constant supply," that there was the greatest desire by the public that it should be introduced, the directors and their officers were perfectly well aware that in truth there was on the part of the owners and occupiers of the houses, in this company's district at least, the greatest apathy on the subject. They, therefore, knew that any movement in the matter must come *ab extra*, and if the change and its assumed benefits were to be brought about at all, it must, in their district at least, be done—and with great patience and forbearance, too—by those having

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Appendix, No. 11.

thorough practical acquaintance with the subject and with the character of the properties and the habits of their occupants.

It cannot be doubted that the Board of Works, charged as they are with such important functions regarding the metropolitan water supply, must be greatly interested to know the result of the operations to which the notice given to them by the company in November last was directed; and now that something like an exhaustive result can be communicated, it has appeared to the directors to be a duty alike to the public and themselves to place it, although unasked, before your Board. This has seemed the more necessary because the directors have—and especially recently—been led to believe that there has been and continues to be considerable misapprehension on the subject; as, for instance, that the company were enforcing "storage cisterns"—were intending to give or were giving the constant supply in the (notice) district "through a minute ferrule" "by a driblet," and were calling for "the introduction of expensive fittings."

It is not the intention of the directors to enter here upon any discussion of these subjects, but I am to confine myself to a plain narrative of facts in respect of the proceedings of this company, and to trust that they will sufficiently condemn the utterly unfounded suggestions to which I have alluded, and which seem to have been widely circulated.

I proceed to the facts:—

The notice to your Board, given in November 1872, was followed, so soon as the month during which the Board could have objected to it had expired, by (as required by the Act) two months' notice individually to each owner and occupier of every house in the district, calling upon all to bring their fittings into compliance with the "Regulations," and warning them, that if this should not be done by the 25th March 1873 (when the constant supply would commence), there would be mischief to the houses and excessive waste of the company's water.

When the day for giving the constant supply arrived, comparatively little had been done by the owners and occupiers to fit the houses to receive it. The company's arrangements had, however, been fully made in the meantime, and, when the supply was turned on enormous waste ensued, and in some instances temporary inconvenience to occupiers may have resulted; although doubtless in many cases, and especially in those of greatest waste, the passage between the leakage and the house drains was neither long nor difficult.

Observe now the value of the suggestion as to storage cisterns.

The statistics of the block are as follows:—

Total number of houses supposed, in November 1872, to be 6,273, and found (miscounting and new buildings accounting for the difference) to be - - - - - - -		6,406
Of these there is now constant supply given to—		
1. With no sort of storeage or the opportunity for it	2,320*	
2. With screw down or screw bottom tap over pre-existing butt (the company having simply not required the butt to be removed) - - -	1,016	
3. By waste-preventers with no storage - - -	745*	
		4,081†
4. Having cisterns (principally previously existing ones), with water closets - - - -	1,325	
Without ditto - - - ditto - - -	1,000	
		2,325
		6,406

Observe next the value of the suggestions about the "minute ferrule" and "the driblet."

Of the 6,406 houses, all but 71 have, so far as the company are aware, the full supply provided for by the regulations, viz., through pipes, valves, &c. &c., furnished by the consumer, with a waterway throughout "not being of less than a half-inch bore in all its course,"‡—and without restriction. In the remaining 71 houses there is restriction, but it has been invited by the consumer, and sanctioned by him in writing. These are cases where the consumer has desired to lessen pressure and so to save expense in the necessary strength, &c., of his fittings, and in their subsequent wear and tear. The directors of this company have always been of opinion that such arrangements are convenient and sufficient for the consumer in the cases in which, in the East London district, they are now or have at any time been in force. The practice has not been at any time one of compulsion. The company

* In perhaps 2,000 of these 2,320 and 745 houses there were butts, which have been removed on the constant supply being given. In none of these houses is there a water-closet, and in none therefore was a cistern required by the company to be put up or retained.

† Of these 4,081 houses, 24 only have water-closets with supply properly connected.

‡ The regulation is in the following terms:—"Except with the written consent of the consumer, no cock, ferrule, joint, union, valve, or other fitting in the course of any 'communication pipe' shall have a waterway of less area than that of the 'communication pipe,' so that the waterway from the water in the district-pipe, or other supply-pipe of the company, up to and through the stop-valve prescribed by Regulation No. 12, shall not in any part be of less area than that of the 'communication pipe' itself, which pipe shall not be of less than a half-inch bore in all its course."

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company have, for years before the passing of the Act of 1871, whilst under no obligation to give constant supply, and with practically no power to give it unless as part of a system generally adopted, to the great convenience of the parties concerned, suggested and given this modified "constant supply." Captain Tyler in his elaborate report in 1867 commended it; the company gave evidence before Parliament and the Regulations' Commission in favour of its practical utility, the Commission saw fit to allow it, "*with the written consent of the consumer*,"* and it is believed that among the occupants of the many thousands of houses so served a single consumer cannot be found to say that the plan has worked inconveniently or unsatisfactorily.

Observe next the value of the suggestion with relation to "the introduction of expensive fittings."

Upon observing, after the 25th March last, the frightful waste of water consequent on the state of the fittings, it became needful for the directors to consider how this must be remedied. It was competent for the company:—

1. To enter the premises and do the necessary repairs at the expense of the owners or occupiers;

2. To enforce a penalty of not exceeding 5 *l.* against each offender;

3. To cut off the supply;

4. To proceed against the premises as for a nuisance.

The directors, in fact, determined to exhaust every reasonable procedure by way of notice and remonstrance, to point out as far as possible the defects in the houses individually, and, after calling on the owners and occupiers themselves, to do no more than was absolutely necessary to prevent waste, then, if these measures should fail, to cut off the supply. They felt that in this course they would give every man the best possible opportunity of making needful changes and additions at a minimum of expense and inconvenience, and that, in threatening to resort, and, if need be, in resorting ultimately to the "cutting off" of the water, they would be using the only pressure of practical utility. If the company had entered and themselves done the work, it would scarcely have been right, or a fitting example if they had not done it with full efficiency according to their views, and probably at a greater expense than the owner or occupier might consider necessary, and numerous disputes—ending perhaps in litigation, perhaps in cutting off—would, as the directors believe, have resulted.

Scarcely was there a house in the first instance which did not require alteration or addition of fitting. By the middle of May the altered houses were about 2,500, with little or no resort to actual cutting off. Before the middle of June it had been necessary to "cut off," in six different lots or localities, 246 houses, but by that date 180 of these houses had conformed, and the supply had been restored. More than half of the whole of the houses in the block were by the end of July in altered condition, but intolerable waste still continued, whilst remonstrance and threat by notice were ceasing to tell upon the remainder, and it had been necessary in the last six weeks to "cut off" more. At any one time not more than 80 houses were off supply, but by the end of July an aggregate of 500 houses had been cut off, and by the end of September the aggregate had come to 800, but only from 80 to 100 houses remained "off" at the latter date. The rest of the block had by that time been altered, and the waste substantially had ceased. There are still some 20 houses "off" supply. Probably an average expenditure of 1 *l.* per house would enable the owners or occupiers of each of these to remedy sufficiently, if not quite satisfactorily, what is amiss; but the directors feel that the company have fully and successfully performed their duty, and that the rest lies with the nuisance authority (which, as required by the 32nd section of the Act of 1871, has had due notice of the "cutting off"), or with the owners and occupiers.

As to the probable cost at which these alterations have been effected, the company have no reliable information, but it cannot in any case have been great. The owners and occupiers have always found the necessary materials and also the necessary labour, except that the company have required to make by their own officers the junction between their new work and the service pipe. For doing or superintending that operation, and for—so far as incidental to it—the opening and closing of the ground, and the replacing of the pavement, the company have in each case been paid half-a-crown. If, as the only parties authorised to interfere with the street, pavement, &c., the company have in any particular case done more than this, they have been recouped by the owner or occupier the trifling cost of the additional labour.

The cost to the company of bringing about the transfer, now completed, has been great. The loss to the company by the waste, if I speak of no other expense, of many millions of gallons of water, every drop of which had been filtered and pumped to its destination, has been upwards of 3,000 *l.*

With reference to the effect of the change, the directors have good reason to believe that it has proved entirely acceptable to the *occupiers* of the houses, and that objections, which have sometimes been converted into complaints against the company and their officers, have proceeded wholly from *owners* who have been unwilling to incur expense, however small.

Before

* *See* note (‡) on preceding page.

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Appendix, No. 11.

Before this letter reaches your Board they will have received the initiative notice for bringing another portion of the East London district, comprising about 3,000 houses in Bethnal-green, Shoreditch, and Whitechapel, under constant supply. In respect of this block, the notice communicated to your Board, points at an intention of bringing it under the new system of supply in three successive divisions. This course, the directors believe, will be more convenient to the parties and the company, than if the whole block were the subject of one operation.

I have only further to notice that throughout the area which was the subject of the notice of November 1872, and in which the transfer of the houses has been just completed, there is now the full opportunity for the Metropolitan Board of Works to place fire hydrants, not only upon mains but upon services. It will be recollected that you were by my letter of 17th December 1872 (to which the directors have not as yet been favoured with any reply), informed that there were then in the district alone of this company 150 miles of mains in at least 100 miles of public streets, and in addition 50 miles of service pipes of five inches diameter, all which mains and services were under constant supply, and on any of which, fire hydrants might at any time during several years then past have been placed. This mileage of services is now largely increased by the addition of those in the streets, &c., of the district brought into constant supply under the notice of November 1872.

I am instructed on the present occasion, as when I addressed you in December 1872, to tender your Board any further explanation which, in exercise of their powers and performance of their duties, in connection with these important subjects, they may require.

I am, &c.
(signed) *Elihu Bates*,
Secretary.

J. E. Wakefield, Esq.,
Clerk to the Metropolitan Board of Works,
Spring Gardens.

Metropolitan Board of Works, Spring Gardens, S.W.,
24 December 1874.

Sir,

The attention of the Fire Brigade Committee of the Board has lately been called, by complaints and inquiries from Local Boards and others, to the delays which, even with the best efforts on the part of the Water Companies, occasionally occur in obtaining a supply of water at fires.

The Committee is well aware that the only certain way of avoiding these delays, and of being always sure of an immediate supply of water available for extinguishing fires, is to have all the mains constantly charged at high pressure. But the Committee is anxious to ascertain whether, in the interval of time which will probably elapse before the attainment of this desired state of things throughout the metropolis, some means might not be found by which the men of the fire brigade would be able, on arriving at a fire, to obtain immediately for themselves a supply of water without waiting for a turncock, in the event of the latter not being at a fire so soon as themselves.

With each fire engine is always carried, as you are aware, a complete set of turncock's tools, so that the firemen have the necessary implements; and what is wanted under the present intermittent system of supply to enable them to get water for themselves, is a knowledge of what mains in the immediate neighbourhood are charged with water at the time. The Fire Brigade Committee therefore ventures to suggest, and would ask your directors kindly to consider, whether some plan could not be adopted of turning the water into the various mains at certain fixed hours of the day, and of making the fire brigade acquainted with the hours fixed for each part of the district, so that on reaching a fire the brigade might know at once where to go for water.

Will you be good enough to lay this letter before your directors, and make the Fire Brigade Company acquainted with their views upon the suggestions offered in it?

I am, &c.
(signed) *J. E. Wakefield*,
Clerk to the Board.

The Secretary,
East London Waterworks Company.

East London Waterworks Company,
16, St Helen's-place, London,
14 January 1875.

Sir,

Your letter of the 24th ult., on behalf of the Fire Brigade Committee of the Metropolitan Board of Works,—on the subject of the "complaints and inquiries from Local Boards and others" with reference to "the delays which occasionally occur in obtaining a supply of water at fires,"—has been under the consideration of the directors of the East London Waterworks Company.

The directors are informed by this letter that the Committee is "well aware that the only certain way of avoiding these delays, and of being always sure of an immediate supply of water available for extinguishing fires, is to have all the mains constantly charged at high pressure, and that the Committee is anxious to ascertain whether, in the interval of time which will probably elapse before the attainment of this desired state of things," the fire brigade

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brigade might not be enabled, "on arriving at a fire, to obtain immediately for themselves a supply of water without waiting for the arrival of the company's turncock."

Your letter further suggests that, as with each fire engine a complete set of turncock's tools is carried, nothing more is "wanted during the present intermittent system of supply than a knowledge of what mains in the immediate neighbourhood are charged with water at the time," and you ask "whether some plan could not be adopted of turning the water into the various mains at certain fixed hours of the day, and of making the fire brigade acquainted with the hours fixed for each part of the district,"—whereby the brigade might, on reaching a fire, know at once where to go for water.

Your letter concludes by asking that the fire brigade may be made acquainted with the directors' views on the suggestions offered.

The directors have received these suggestions and inquiries with profound astonishment.

They would in any case be unable to point out how the plan you submit for adoption could be carried out; but under existing circumstances it does not seem necessary to pursue that view of the subject.

You are requested to refer to my letter to you of the 17th December 1872, on the subject of supply of water at fires, and especially to the following paragraphs of it:—

> "Now of these mains there are within the company's limits at least 150 miles, laid in at least 100 miles of public streets and roads (sometimes one main and sometimes more in the same street or road), and in which the water is, and for many years past has been, in constant supply under pressure.* To this full extent, therefore, there may now be, and there might for several years past have been, placed any proper hydrants and other apparatus which the public authority in charge of this duty might desire and might adjust with this company."
>
> * * * * * * * * * *
>
> "I am to add that for several years past there have been within the company's limits very many miles of 'service' pipes in which the water has been in constant supply under pressure. This mileage has been continuously increasing, and now amounts to more than 50 miles of service pipes."†
>
> * * * * * * * * * *
>
> "I am to add that, making this communication in the sincere desire of promoting improvement, and not merely of removing from this company a cause of expense to themselves and of dissatisfaction to others, the directors and their officers will be found most ready to give every further explanation and information which may assist the Board of Works in the exercise and performance of the duties imposed on them in connection with this important subject."

The receipt of this letter was acknowledged; but, except so far as your letter of the 24th ultimo may be so considered, no communication of any kind has been made to this company by the Board of Works on the subject of it; nor, so far as the directors are informed, has any step been taken by them for availing themselves of the condition of things which was thus brought under their notice.

On the 31st December 1873, this company reported to the Metropolitan Board of Works, in a letter addressed by me to you, the complete introduction, under the powers of the Metropolis Water Act, 1871, of constant supply into a part of their district comprising 6,406 houses.

This letter concluded with the following paragraphs:—

> "I have only further to notice that, throughout the area which was the subject of the notice of November 1872, and in which the transfer of the houses (the 6,406 houses above referred to) has been just completed, there is now the full opportunity for the Metropolitan Board of Works to place fire-hydrants not only upon mains, but upon services. It will be recollected that you were, by my letter of 17th December 1872 (to which the directors have not as yet been favoured with any reply), informed that there were then, in the district alone of this company, 150 miles of mains in at least 100 miles of public street, and, in addition, 50 miles of service pipes of five inches diameter, all which mains and services were under constant supply, and on any of which fire-hydrants might at any time during several years then past have been placed. This mileage of services is now largely increased by the addition of those in the streets, &c. of the district brought into constant supply under the notice of November 1872.
>
> "I am instructed on the present occasion, as when I addressed you in December 1872, to tender your Board any further explanation, which, in exercise of their powers and performance of their duties in connection with these important subjects, they may require."

This

* The company's limits extend beyond the metropolis; and the number of miles of main in constant supply under pressure in the latter area is (31st December 1874) about 120; that is to say, 70 where there is (in the houses) constant supply, and 50 where there is (in the houses) intermittent supply.

† There are in all (31st December 1874), in the company's district within the metropolis, five times this length of service pipes; that is to say, of pipes leading off from the mains, and feeding the "communication pipes," which latter form the connexion with the houses individually; and of these service pipes at least half are in constant supply under pressure.

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This company has received no communication of any kind from the Board of Works respecting this second letter beyond the acknowledgment of its receipt.

In December 1873, the notice, rendered necessary by the Act of 1871, was served by this company on the Board, intimating the company's intention to bring a further part of their district under constant supply; and on 15th October 1874 a third (similar) notice was so served, and later, in the same month, a fourth such notice. The company have completed the conversion under the second notice, and are actively engaged in the conversion to which the third notice refers. The statutory notices are running in the fourth case, and the company will proceed with the intended changes so soon as they are expired. These several area, as the notices show, adjoin. Together they comprise about 14,000 houses, and about 20 miles of mains, and 45 miles of services.

But, except the formal acknowledgment of the notices, not a word of communication or inquiry has come to this company from the Board of Works on the subject of them; nor, so far as the directors are aware, has there been on the part of that Board in this company's district one iota of change in respect of their user of the company's water in the case of fires.

Notwithstanding all the information and action on the one hand, and silence and inaction on the other, the directors are now told that the Fire Brigade Committee "is well aware that the only certain way of avoiding the delays complained of, and of being always sure of an immediate supply of water available for extinguishing fires, is to have all the mains constantly charged at high pressure," and that "what is wanted under the present intermittent system of supply" is "a knowledge of what mains in the immediate neighbourhood are charged with water at the time" of a fire. This is somewhat disheartening, and leads the directors to fear that mains may continue to be constantly supplied, and notice thereof given in vain.

Indeed, the directors are constrained to conclude that, notwithstanding the great anxiety of the Metropolitan Board of Works for the introduction of the constant supply, and for better arrangements for the use of water in the extinction of fires, my letters of December 1872 and December 1873 have never been read or never been considered; and that the bearing on this subject of this company's action in the districts which they have brought, and are bringing, entirely (mains and services) into constant supply under pressure, has never received the attention of your Board.

Under their instructions, and in the hope that it may be no longer misunderstood or unappreciated, I briefly recapitulate the position:—

1. There is, throughout the company's district *within the metropolis*, a constant supply of water under pressure (day and night, Sundays and holidays) in all their leading water carriers or mains, these mains occupying at least 70 miles of streets and public ways.

2. On these mains there are neither fire-plugs nor hydrants; no plugs, because they would be driven out by the pressure; no hydrants, the Metropolitan Board of Works knows why.

3. There is in the same district a constant supply under pressure in "services" throughout the two areas described in the notices of December 1872 and December 1873, and in a few weeks this will be true of the third and fourth areas described in the notices of October 1874; and, besides *these* "services," there are 100 miles of services constantly so charged in various other parts of the company's district.

4. The directors are quite prepared, and would have been found at any time prepared, to allow the company's officials to attend upon any officers of the fire brigade, and point out to them *in situ* the mains and services to which allusion has been made, and everything else which they may desire to know or ought to know; and the company would still be willing to continue the gratuitous services of their turncocks as heretofore. Even on the full introduction of the constant supply system, the companies must still have turncocks, and they would, perhaps, always be better acquainted with the surfaces of the streets, their marks and changes, than the fire brigade men.

5. The position of all plugs available for fire service, and of the cocks commanding services, can, if desired, be marked on an illustrative map. Thus the men of the brigade would, with "the necessary implements," be enabled to gain immediate access (turncock or no turncock) to the company's water.

6. The company would willingly extend this information and map to the *services* in that part of their district within the metropolis where the services are intermittently supplied; but, as these will be continually reduced in number, and the *mains* in these parts are constantly supplied, it would seem unnecessary so to extend the map.

I am to add that, whilst anxious to afford your Board all the aid which can reasonably promise improvement in the present state of the question, the directors feels strongly the injustice of the position in which the company is placed. The company are purveyors of water only. They admit that it is their duty to allow their water to be taken gratuitously for the extinction of fires, and to facilitate its use in every way consistent with the prior and yet more important duties of the company; but they protest that it is not their duty to bear the expense incident to maintaining the present slovenly and imperfect practice, and

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and they ought not to be subjected to the aggravated waste which is necessarily incident to it.

On the contrary, they call upon the Metropolitan Board of Works to appreciate and avail themselves of the condition of things which has been so carefully and repeatedly brought under their notice—to place proper hydrants upon the mains and available services—to assume the entire responsibility of their maintenance and use—and to relieve the public from the dangers and losses to which they are exposed, and this company, not merely from the expense, but from the obloquy to which they are so unjustly subjected.

It is not the state of the water supply, but the means of using it, which are at fault; and it is just and necessary that now at least this undoubted truth should be no longer misunderstood; and that it should be made generally known to whose neglect it should be attributed that the public are, to so great an extent, in this company's district, deprived of proper safeguards against fire.

The directors are not aware whether you are making inquiries of the other metropolitan waterworks companies, similar to those addressed to this company in your letter of the 24th ultimo. This letter emanates from the East London Water Company alone, and is written without reference to the other companies or the conditions of the water supply in other parts of the metropolis; but the directors desire me to call your attention to the "general remarks" appended monthly to the official reports of Major Bolton, the water examiner appointed under the Act of 1871, respecting the water supplied by the metropolitan water companies. In these public documents will be found monthly a statement of "the number of miles of streets which contain mains constantly charged, and upon which hydrants could at once be fixed in each district of the metropolis." The total length of such mains stated in Major Bolton's report of 1st October 1874, is 666½ miles. Owners availing themselves of this position appear in many instances to have established hydrants within their private properties. Your Committee, better than Major Bolton, or the directors of this company, can tell how many have, in fact, been fixed upon these mains and are available for public use; and it is well that the public should know with whom rests the responsibility of withholding the proper means for the extinction of fires, the opportunity for supplying which has thus been so repeatedly brought under notice.

I am, &c.

J. E. Wakefield, Esq., (signed) *E. Bates*, Secretary.
Clerk, Metropolian Board of Works.

WATER SUPPLY AT FIRES.

Metropolitan Board of Works, Spring Gardens,
Sir, 18 January 1875.

I BEG to acknowledge the receipt of your letter of the 14th instant, and to inform you that it will be laid before the Fire Brigade Committee.

I am, &c.

(signed) *J. E. Wakefield*,
E. Bates, Esq. Clerk of the Board.

Metropolitan Board of Works, Spring Gardens, S.W.,
Sir, 25 February 1876.

THE Board has had under consideration your letter of the 14th January 1875, in reply to one addressed to you by the Fire Brigade Committee, with reference to the delays which occasionally occur in obtaining a supply of water at fires. You refer the Board to your letters of the 17th December 1872, and the 31st December 1873, in which you state the number of miles of mains and service pipes in which there is a constant supply at high pressure, on which fire hydrants might be placed, and make mention of the notices which the company has served upon the Board of its intention to give a constant supply in various districts within the company's water limits. Of these communications you complain that the Board has taken no notice beyond acknowledging their receipt.

You conclude by urging the Board to place proper hydrants upon those mains which are constantly charged, and intimate that, if this be not done, upon the Board will rest the responsibility of withholding the proper means for the extinction of fires.

It appears necessary at the outset to deal with that part of your letter which refers to the fact that, beyond acknowledging the various notices and letters from the company, no communication has been made to the company on the subject of them, and in which it is inferred that those letters have never been considered, and that the bearing of the company's action has not received attention. So far from this being the case, the Board, directly it had ascertained that the system of constant supply in one of your company's districts, and in one of the districts of another company was in operation, caused a careful house to house inquiry to be made throughout those districts, to ascertain whether the supply afforded was sufficient, what inconvenience the occupiers of the houses were put to in altering the fittings, what was the expense of the alterations, and many other particulars. These inquiries occupied several persons many months.

Turning now to the principal subject of your letter, which is the provision of hydrants as a means

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a means of extinguishing fires, the question is this, is it the duty of the Board, under existing circumstances, to place hydrants on all the permanently charged mains, not only of the East London, but of all the metropolitan water companies who have already adopted, or may hereafter adopt, partially or wholly, the system of constant supply?

The directors of the East London Company, it is true, state in the concluding paragraph of their letter that they write without reference to the other companies, or the conditions of the water supply in the other parts of the metropolis, but they, of course, well know that the Board's responsibilities extend to the whole of the area under its jurisdiction. The question of providing hydrants therefore assumes a most serious aspect, involving as it does the establishment of an entirely new system, so far as the metropolis is concerned, of extinguishing fires at a large additional expenditure, with grave doubts whether the new system might not possibly in the end fail to supersede the costly but very efficient establishment at present existing.

The Board, as the authority charged by the Legislature with the extinction of fires in the metropolis, has felt it to be its duty to urge the importance of a constant supply of water at high pressure for the extinguishing of fires, and has from time to time directed the attention of the companies to the delay which has occurred in obtaining water at fires, as the Board is convinced that if the existing mains and services were constantly and continuously charged the fire brigade would, without the use of hydrants, be able to obtain a sufficient supply of water for extinguishing fires. To these communications are probably due the company's urgent appeal to the Board to place hydrants on the mains as apart from the service pipes as being the only proper means for the extinction of fires.

Great stress is laid in your letter on the alleged neglect of the Board in not providing hydrants, and you say "that the directors are constrained to conclude that the bearing on this subject of this company's action in the districts which they have brought and are bringing entirely (mains and services) into constant supply under pressure, has never received the attention of your Board." This conclusion, however, is an erroneous one. Immediately after the passing of the Metropolis Water Act of 1871, the bearing of the 34th Section of that Act, which relates to fire hydrants, was carefully considered, and at no time since then has the matter been lost sight of.

The question for consideration appeared to be whether the conditions of the water supply of London would admit of hydrants being made available as a substitute in ordinary cases for fire engines, as they are in certain northern towns where the water, gravitating from reservoirs at a high level, flows through the pipes at such a pressure as that, when a hose and jet are put on a stand-pipe, the water is thrown continuously to the tops of the highest buildings.

It appeared to the Board that the necessary conditions for such a use of hydrants did not generally exist in London, but in view of the representations made by the water companies, and of an opinion which was more or less generally held, that hydrants might be effective for extinguishing fires, the Board determined, in November 1873, to make a trial of hydrants in one of the districts placed under constant supply on the south side of the Thames. The results of this trial were not such as to encourage the hope that hydrants could at present be brought into general use in the metropolis as a means of extinguishing fires without engines.

After this, the Board, desiring to obtain all the information possible on this important subject, applied to the corporations of Manchester, Edinburgh, Glasgow, and Liverpool for the results of their experience. The particulars furnished by these corporations were fully considered, and, as there were many points upon which further information was required, and which it appeared could only be obtained by personal observation and inquiry on the spot, a sub-committee was deputed to visit Manchester and Liverpool to make these inquiries, and to ascertain all the facts which could help the Board in its consideration of the question.

The information obtained by the members of this sub-committee, and the experiments they witnessed, conclusively showed the value and efficiency of hydrants for extinguishing fires where there is a constant water supply under really high pressure.

It appears that in Manchester and Liverpool hydrants are sufficient for all ordinary fires, without the aid of engines, and it is probable that, if water were applied in London under the same conditions, that is to say, if the Board had control over the pressure, the size and fittings of the mains and the direction of the flow through them, hydrants might in most cases be equally serviceable. The conditions of the water supply in the two large northern towns are, however, so entirely different from those of London, that the idea of obtaining the same results in the metropolis from the adoption of hydrants cannot, for the present at any rate, be entertained.

At Manchester the water works are the property of the corporation. The water is served from 13 reservoirs, the surface of water in the highest of those used for the extinction of fires being 478 feet above ordnance datum. The supply to the city is consequently by gravitation and constant high pressure, and from the variety in the levels of the reservoirs, a choice of three or four different pressures can be obtained for extinguishing fires, according to circumstances.

The conditions of the water-supply for the extinction of fires in Liverpool are very similar to those of Manchester.

In London, on the other hand, the conditions of the water supply are, it is hardly necessary to point out, entirely different. The water, instead of flowing through the pipes under a high pressure derived from the height of the source of supply, is more generally forced through

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through by pumps; and, from observations made under the direction of the Board's engineer in many parts of London, in the different companies' district, and at various heights, it appears that the rates of pressure vary so much, and in some places are so low, that it would be impossible to rely upon such pressures to furnish continuously jets of sufficient height for fires. The figures placed before the Board lead it to this conclusion, and the Board's engineer distinctly advises with reference to the use of hydrants for the purpose of extinguishing fires, that they would not be of real practical advantage to the Board, unless a sufficient pressure of water were insured, and that this cannot be the case so long as the management of the water supply is under the independent control of different companies.

In reply, therefore, to the representations made by the East London Water Company on the subject, I am directed to say that the Board, taking account of all the considerations which affect the question, and especially the pressure found to exist in the districts in which a constant supply is given by your company, is of opinion that the placing of hydrants throughout the district of the East London Water Company would not, at present, be of such public utility as would justify the Board in incurring the large expenditure which the operation would entail.

I am, &c.

(signed) *J. E. Wakefield,*

The Secretary of the East London Water Company. Clerk of the Board.

EAST LONDON WATERWORKS.

Sir, 13 April 1876.

THE directors of this company have given full consideration to the letter of the 25th February last, which you were instructed by the Metropolitan Board of Works to address to me on the two important subjects of extending the system of constant supply, and of improving the means of using this company's water for extinguishing fires.

You refer to my letters of the 17th December 1872, the 31st December 1873, and the 14th January 1875.

With reference to the two former of these, they must be regarded as statements bringing under the notice of the Metropolitan Board facts and suggestions, voluntarily communicated, as to the system of constant supply, and as to improvements in the use of water in cases of fire.

These facts and suggestions it was considered that your Board would be interested in knowing, and that, having regard to their "duty" "of extinguishing fires and protecting life and property in the metropolis in case of fire," under the Act of 1865, to the prominent position which they took in the inquiry before Parliament incident to the passing of the Metropolitan Water Act of 1871, and in the settlement of the "regulations" made under that Act by Lord Methuen and his colleagues in 1872, they ought to know them.

The letters were written "in the sincere desire of promoting improvement," and each of them tendered any further explanation which your Board might desire; but, it is true, as your letter of February recapitulates, that beyond a formal acknowledgment of the receipt of each, no communication on the subject of either of them was made to the company until the 14th December 1874, about a year after the date of the later letter.

In your letter of 14th December 1874, it was stated that—

> "The fire brigade committee of your Board were well aware that the only certain way of avoiding delays in obtaining a supply of water at fires was to have all the mains constantly charged at high pressure;"

and that the committee were anxious to ascertain whether—

> "before the attainment of this desired state of things means might not be found by which the men of the fire brigade would be able on arriving at a fire to obtain immediately for themselves a supply of water without waiting for a turncock, in the event of the latter not being at a fire so soon as themselves."

Your letter of that date also suggested that as with each fire engine a complete set of turncock's tools is carried, nothing more was—

> "wanted during the present intermittent system of supply than a knowledge of what mains in the immediate neighbourhood are charged with water at the time,"

and you asked—

> "whether some plan could not be adopted of turning the water into the various mains at certain fixed hours of the day, and of making the fire brigade acquainted with the hours fixed for each part of the district,"

whereby the brigade might, on reaching a fire, know at once where to go for water.

In reply to this letter I was instructed to inform you that—

> "There is *throughout this company's district within the metropolis* a constant supply of water under pressure (day and night, Sundays and holidays) in *all* their leading water carriers or mains;"—

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"The directors are quite prepared—and would have been found at any time prepared—to allow the company's officials to attend upon any officers of the fire brigade and point out to them *in situ* the mains and services to which allusion has been made, and everything else which they may desire to know, or ought to know, and the company would be still willing to continue the gratuitous services of their turncocks as heretofore. Even on the full introduction of the constant supply system the companies must still have turncocks,* and they would, perhaps, always be better acquainted with the surface of the streets, their marks and changes, than the fire brigade men.

"The position of all plugs available for the service, and of the cocks commanding service can, if desired, be marked on an illustrative map. Thus the men of the brigade would with 'the necessary implements,' be enabled to gain immediate access (turncock or no turncock) to the company's water."

The suggestions which I was instructed to make for meeting more especially the interim condition of things which your letter assumed, and as to which your Committee then desired information and advice, have led to nothing; and whilst in the long interval not a syllable of further communication respecting the subject of them, nor a breath of change in the existing practice has transpired, your letter of the 25th February last takes no notice whatever of this branch of the subject. It must, therefore, be implied that the Committee does not in 1876 feel that their inquiries or our replies of 1874-5 are of any importance.

I turn, therefore, now to the more recent phases of the subject, as presented to this company by your letter of February last, and to the conclusion of the Committee, that—

"taking into account all the conditions which affect the question, and especially the pressure found to exist in the districts in which a constant supply is given by your company, the placing of hydrants throughout the district of the East London Waterworks Company would not at present be of such public utility as to justify the Board in incurring the large expenditure which the operation would entail."

In the first place, it is felt to be desirable that your committee should at all events not be ignorant that the extension of the system of constant supply in this company's district has, since the date of my last letter, progressed as then intended; so that in addition to 35,000 houses, the mains for serving which were so charged (with constant supply under pressure) before 1872, the number of houses changed, in and since 1872, from intermittent to constant supply, is upwards of 25,000, making a total thus served of considerably more than half of all the company's supplies.

Again, it is desirable that your Committee should be reminded that the constant supply under pressure in all the company's leading water carriers or mains, spoken of by me in 1875, still continues, and that these water carriers or mains occupy 70 miles of streets and public ways; and that your Committee should be informed that in all the *seven* areas in which the company has since 1871 changed the intermittent to the constant supply (and of which your Board has had full descriptive particulars), there are 'services,' amounting at least to 70 miles, constantly charged under pressure—a matter to be borne in mind, although, of course, the pressure in services cannot be equal to that in the mains.

Thus it will at least be seen that this company, which intends step by step to bring its entire district under constant supply, has not been slow in their progress hitherto.

Contrast this activity on the one side with, on the other, a deliberate statement of your Board on an important occasion in 1871†—their letter of 14th December 1874—and their now determination.

Nor, although this letter must be taken as proceeding from this company alone, and the directors of this company do not affect to be accurately acquainted with the condition of things in the districts of the other water companies, can they omit to bring under your notice the following pertinent extract from the monthly report for February last, made by Major Bolton (the metropolitan water examiner appointed by the Government):—

"The

* I am instructed here to add that, as the constant supply progresses, turncocks (proper) will be superseded by inspectors, who will have larger districts, and be less numerous, and hence their prompt attendance at fires will be less reliable. Knowledge of, control over, and instant access through hydrants to the water supply, will thus become more and more the duty and the need of the fire brigade

† When (on 19th July 1871) the Hydrants' Clause (now Section 34 of the Metropolis Water Act, 1871) was discussed and passed by the Committee then sitting, the honourable Member for Salford (Mr. Cawley) expressed himself thus:—"As it stands at present, we have it given in evidence that the Act of 1847 is inoperative, and the Fire Brigade Act also, because the word plug is used, and therefore all over London you have got the old wooden plug, which is a great nuisance. There is no means of enforcing the putting of hydrants on where they ought to be put on. I propose to remedy that by interpreting the word plug." Upon this the counsel for the Metropolitan Board of Works was instructed to say:—"The clause" (being the clause prepared by the water companies, and now forming Section 34 of the Act) "itself goes very far beyond the immediate point which has been mentioned by the honourable Member for Salford. As regards that, I do not think that we have any objection to it, but the clause goes very far in excess of that. What the evidence has gone to which you have heard upon this subject is this. No doubt Mr. Bateman and others described the plug as a thing which is behind the age, and altogether a disgrace to the metropolis as a substitute for hydrants. *To that, of course, we do not object; but it has also been urged against us that we have not put them down. The ready answer to that is, that we have not known where to put them down, because the mains have not been charged.* So soon as this Bill becomes an Act, and comes into operation after an appointed time, we shall have a right to assume that every pipe—I use the word in the largest sense—whether a main or service, will be fully charged, and then it will be for us to discharge the duty which is imposed upon us by the Fire Brigade Act, under Section 32, having greater facilities for so doing by the proposed alteration of hydrants for plugs."

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"The number of miles of streets which contain mains constantly charged, and upon which hydrants for fire purposes could at once be fixed in each district of the metropolis, is as follows:— Kent, 80 miles; New River, 169; East London, 70; Southwark and Vauxhall, 100; West Middlesex, 70; Grand Junction, 41½; Lambeth, 90; Chelsea, 50; making a total length of 670½ miles; and the water companies are ready to affix hydrants thereon when required by the authorities. The total number of hydrants erected is at present 2,622; of which 2,077 are for private purposes, 276 for street watering, and 269 for public use."

Thus it is perfectly plain that, in point of length of streets occupied, and of number of houses within the reach of mains "constantly supplied under pressure," these are such as not merely to justify but to call loudly for the intervention of the body which has sought to be, and has been authorised, by statute, to undertake the duty "of extinguishing fires and protecting life and property in the metropolis in case of fire." Individual owners, it will be observed, have not been so slow in recognising the utility of hydrants.

Nevertheless, it may, without inconsistency, be the opinion of your Board that there is "no sufficient pressure of water"—"that such cannot be the case so long as the management of the water supply is under the independent control of different companies," and that in the meantime "hydrants for the purpose of extinguishing fires would not be of real practical advantage to the Board." In stating these opinions, you refer to the superior arrangements for like purposes in some of the northern towns—especially Manchester and Liverpool—not, however, without noticing that "the condition of the water supply in those towns is so entirely different from those of London, that the idea of obtaining the same results in the metropolis from the adoption of hydrants cannot, for the present at any rate, be entertained."

The position thus taken up by the Board, and the reasons thus given for not utilising by hydrants the water supply of East London as it exists—must be founded on such assumptions as these—that—(1) because *all*, which is accomplished "under so entirely different conditions" elsewhere, cannot be accomplished in London, therefore *nothing* should be done—(2) because, if there cannot be the highest desirable pressure, the use of such pressure as there is should be rejected—and (3) because, as, when the municipal authorities of the metropolis shall supersede the existing purveyors of water, the existing water carriers or mains will be superseded and the pressure vastly increased, therefore that all money spent in fixing hydrants under present circumstances would be thrown away.

Whereas the directors and their advisers, after some experience on the subject on which they venture an opinion, are satisfied that whatever change there may be in the management of the water supply (municipal as against commercial), not one of these assumptions will be practically verified.

No practical man can doubt that the fire brigade would gain vastly if they had the water, even under limited pressure, served through hydrants under their own control.

In many, perhaps in most instances, the pressure would be enough for every purpose, and would render engine power unnecessary. In all cases it would be useful; but, independently of this, is immediate and direct access by the firemen to their own supply—is concentration—is rapid delivery (especially to the steam engines of the present day) no justification for hydrants? And are we always to have the old plug in the *service*, with the water running away as soon as the plug is drawn, and its intolerable waste, instead of the modern hydrant on the *main*, simply because the pressure in the main will not always supersede pumping power? The same argument would have stopped the improved system in Manchester; for even there they have fire engines.

Again, any assumption that on transfer of the metropolitan water supply from the companies to the municipal authorities, the physical conditions and the pressure will not (otherwise than exceptionally) remain substantially the same, is an exaggeration; and we may safely rely that, with whatever improvement in comparatively slight details, *the existing water carriers and any hydrants which might in* 1676 *be placed on them would remain in use and serve the purposes of any new controlling body*; in other words, that expenditure in the now fixing of hydrants would be by no means wasted.

The substitution of larger mains, and the fixing of the necessary hydrants, when their day of management shall arrive, appear to be treated by your Board as matters of course; but in London, and in all other places the extent of pressure and the capacity of main which will be at disposal for the *exceptional* purpose of putting out fires will practically always be measured or governed by the extent of pressure and capacity of main which is capable of being maintained and is needed for the *ordinary* objects of the supply.

For instance (notwithstanding any implication to that effect which may be intended to be created by the statements in your letter), it would never come to pass in London, even if it be practically true in Manchester, that there will be pressure for the extinction of fires from a level of 478 feet above Ordnance datum, nor, if it be practically true in Manchester, will firemen in London ever find themselves in the position practically to "choose, according to circumstances, between three or four different pressures in extinguishing fires."

In this company's district, the directors have instituted and kept on foot gauges for registering the pressure throughout their limits, and are thus enabled to watch and correct what may be amiss; and if your Board or their officers have been examining the pressure in the East London district the results can scarcely be accurate, as the observations have been made wholly without communication with this company or its officers. The pressure practically

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practically aimed at is that which is enough for all the primary and more important purposes of the company, namely, *the punctual and adequate supply of their customers* to the height of 40 feet above the level of the pavement where each respective supply is due. The available pressure for such purposes, and incidentally for fires, is ordinarily greater than this, and is gained by pumping into stand pipes at altitudes of 100 feet and 125 feet, and to a reservoir 140 feet, severally above the ground level of the pumping engines. Whatever theories may be from time to time put forward, the directors cannot but believe that this pressure, or the very like of it, is that which will always obtain in East London, and that, if properly utilised by hydrants, it would, the circumstances of the district considered, be found very efficacious in the extinguishing of fires.

After patient consideration of the subject, the directors remain unshaken in their opinion that in omitting to furnish and fix hydrants on this company's existing mains, a vast opportunity of improvement is lost, and a vast responsibility assumed by the Metropolitan Board of Works, whilst things are persistently kept at the worst by them whose duty, and whose exclusive duty, it is to improve them. The water companies are in the meantime subjected not only to most unjust obloquy in respect of the present slovenly and imperfect practices (with which they have properly nothing to do), but also to the aggravated waste of their water, which is incident to them. No wonder, therefore, that they feel aggrieved; but the determination of your Board not to alter the present state of things is of even greater interest to the owners of property and the lives of residents within the metropolis.

I have only to add a remark upon the information which your letter for the first time conveys, that your Board "have caused a careful house-to-house inquiry to be made through the districts placed under constant supply by this company, to ascertain whether the supply afforded was sufficient, what inconvenience the occupiers of the houses were put to in altering their fittings, what was the expense of the alterations, and many other particulars; the inquiries having occupied several persons many months."

The directors of this company have always regarded the question of constant supply, and the important details inseparable from it, as matters of the deepest concern They have in the management of their district conducted themselves accordingly; and they have been most desirous, had there been becoming opportunity, to submit and explain to the public beyond their district, the results of the extensive changes which they have effected within it. But they have felt that, uninvited, they would be stepping beyond their duty in doing so.

The position of the Metropolitan Board of Works, which has, before Parliament and before Lord Methuen's Commission, intimated such anxiety for the extension of constant supply, and which has such important duties in respect of it, is widely different. However, they have simply done nothing; and if there have been reasons why the Board has never given any expression of sympathy or of opinion to this company on any of the seven occasions when the company has challenged an expression of the Board's views by bringing under its notice the company's intention of placing new areas under constant supply, the directors are indeed surprised that the Board have seen fit to withhold the result of the inquiries, which it appears to have conducted with so much care and so much expense, in supervision of the company's proceedings, although without any communication with them.

I am, &c.
(signed) *Elihu Bates*,
Secretary.

J. E. Wakefield, Esq.,
Clerk, Metropolitan Board of Works.

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Appendix, No. 12.

PAPERS handed in by Captain *Shaw*, 14 May 1877.

FIRE BRIGADES IN VARIOUS TOWNS.

PLACE.	Estimated Area in Square Miles.	Estimated Population.	False Alarms.	Chimney Alarms.	Fires.	Total.	Number of Firemen.	Number of Engines.					Number of Stations.	Annual Cost.	Approximate Value of Plant.
								Steam.	Manual.	Chemical.	Floating.	Total.			
														£.	£.
Albany - -	13	75,000	–	–	120	120	218	10	–	–	–	10	10	21,897	70,686
Baltimore - -	16	240,000	9	–	166	175	199	15	–	–	–	15	16	31,595	—
Birmingham -	13	344,000	1	1	99	101	565	–	–	–	–	–	–	39,167	—
Boston - -	–	350,000	21	–	462	483	660	36	2	8	1	47	58	97,930	72,162
Brooklyn - -	14	350,000	59	–	100	159	1,428	10	6	–	–	16	–	—	—
Brussels - -	5½	300,000	–	–	80	80	150	3	9	–	–	12	11	6,920	—
Buffalo - -	22	130,000	17	–	136	153	596	14	–	1	–	15	25	34,140	75,224
Chicago - -	34	550,000	123	–	477	600	405	31	–	5	–	36	45	95,668	192,890
Cincinnati -	–	300,000	90	–	223	313	151	20	–	–	–	20	18	54,210	—
Detroit - -	10	82,000	49	–	183	232	117	9	–	2	–	11	8	20,544	68,866
Dublin - -	–	268,000	2	208	96	306	27	2	3	–	–	5	2	1,335	—
Glasgow - -	9	454,000	–	–	300	300	–	–	–	–	–	–	6	—	—
Liverpool - -	8¼	517,000	–	–	210	210	184	3	15	–	–	18	19	4,737	—
London - -	121	3,500,000	91	64	1,632	1,787	406	26	92	–	3	121	53	80,000	45,000
Manchester -	6½	370,000	–	–	308	308	51	2	6	–	–	8	17	2,466	—
Montreal - -	–	110,000	112	–	199	311	60	–	–	–	–	–	–	8,799	—
New York -	18	1,069,000	559	–	823	1,382	869	55	4	9	1	69	68	249,617	—
Paris - -	28	1,987,000	–	–	592	592	1,548	–	–	–	–	159	92	100,000	—
Philadelphia -	129⅓	818,000	240	–	810	810	399	34	4	–	–	38	36	96,114	—
Pittsburgh - -	25	125,000	247	–	222	469	126	12	–	–	–	12	16	27,666	84,445
Quebec - -	–	65,000	73	–	50	123	22	–	7	–	–	7	6	—	—
St. Louis - -	–	240,000	–	–	219	219	–	18	–	1	–	19	21	58,467	—
San Francisco -	–	273,000	29	28	255	312	245	15	–	–	1	16	20	52,519	—
Toronto - -	–	60,000	26	–	53	79	50	3	–	–	–	3	2	2,508	—
Troy - - -	–	50,000	28	–	60	88	413	7	1	–	–	8	7	8,368	—

Metropolitan Fire Brigade,
Chief Station, Watling street, London,
14 May 1877.

Eyre M. Shaw,
Chief Officer, Metropolitan Fire Brigade.

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Appendix, No. 12.

METROPOLITAN BOARD OF WORKS.

REGULATIONS concerning PAY and PENSIONS for the METROLITAN FIRE BRIGADE.

RATES OF PAY.

IN consideration of pensions according to a fixed scale being hereafter granted to the officers and men of the Metropolitan Fire Brigade, their pay will in future be as follows:—

	£.	s.	d.			
Superintendents -	195	–	–	a year, with free quarters, coal and gas.		
1st Class Engineers -	2	7	9	a week	,,	,,
2nd Class Engineers	2	1	–	,,	,,	,,
1st Class Firemen -	1	14	3	,,	,,	,,
2nd Class Firemen -	1	10	10	,,	,,	,,
3rd Class Firemen -	1	7	5	,,	,,	,,
4th Class Firemen -	1	4	–	,,	,,	,,

PENSIONS AND GRATUITIES.

1. Pensions and gratuities will be granted as follows:—
   (*a*) After 15 years' service completed, fifteen-fiftieths of the pay.
   (*b*) For each additional year of service completed, up to 20 years, an additional fiftieth of the pay.
   (*c*) From 20 to 25 years completed, two-fiftieths for each year.
   (*d*) From 25 years, an additional fiftieth for each year up to 28 years completed, when the pension will be of the maximum amount, viz., two-thirds of the pay.
   (*e*) All pensions to be for life.

2. After five years of approved service, and less than 15, a gratuity of one month's pay for each year of service will be granted.

3. In calculating the pensions to be granted to Superintendents and Engineers according to the foregoing scale, the value of their allowances shall be taken into account in addition to their pay. For this purpose the value of the Superintendent's allowances shall be taken as 1 *l.* a week, and the value of an Engineer's allowances as 15 *s.* a week.

4. The case of any man disabled by injuries received in the execution of his duty shall be specially considered on its merits; but any pension granted to a man so disabled shall not be less than the pension that he would be entitled to receive according to the foregoing scale.

5. Any man, whether incapacitated or not, who shall leave the force, having attained the age of 55 years, and completed 30 years' service, except for misconduct, shall receive a pension of the maximum amount, viz., two-thirds of his pay.

6. No pension or gratuity shall be granted to any man who has served less than 30 years, or who has not attained the age of 55 years, except on the certificate of one of the Medical Officers of the Brigade that he is incapacitated by infirmity, accompanied by the certificate of the Chief Officer that he has served with zeal and fidelity.

NOTE.—Men who, before entering the service of the Board, served as Firemen or Fire-escape conductors under the late London Fire Engine Establishment, the Royal Society for the Protection of Life from Fire, or any parochial authorities in the Metropolis, will have their service reckoned from the date of their entering into either of such employments, provided that their service shall have been continuous.

The amount of the Firemen's Savings Fund standing to the credit of each man will continue to belong to him, interest thereon being added annually; and he will be allowed to withdraw the same as now when he leaves the service.

The foregoing regulations came into force on the 28th January 1877.

Spring Gardens,
9 February 1877.

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TO THE

REPORT

FROM THE

SELECT COMMITTEE

ON

METROPOLITAN FIRE BRIGADE.

Ordered, by The House of Commons, *to be Printed*,
17 *July* 1877.

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City of London:

1. *Jurisdiction of the Fire Brigade within the City.*
2. *Action of the Police in reference to Fires.*
3. *Steps taken by the City Authorities in laying down Hydrants.*
4. *Cost of Hydrants.*
5. *Water Supply; Pressure available for Hydrants.*

1. *Jurisdiction of the Fire Brigade:*

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2. *Action of the Police in reference to Fires:*

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3. *Steps taken by the City Authorities in laying down Hydrants:*

Intention of the City Commissioners of Sewers to place about 1,000 hydrants in the city, which will throw water to a height of from seventy to eighty feet, *Fraser* 336–343. 395——Constant supply, with hydrants, in operation at the Post Office and other large buildings, *ib.* 410.

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4. *Cost of Hydrants:*

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5. *Water Supply; Pressure available for Hydrants:*

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Cost (*Annual Expenditure*). Additional increased cost of about 40,000 *l.* a year by increasing the fire brigade to 931 men, *Shaw* 4926–4928——Apparent saving of about 30,000 *l.* a year by laying down hydrants universally, and by utilising the police in lieu of increasing the brigade to a force of 931 men, as contemplated by witness, *ib.* 4931–4934.

Return submitted by Captain Shaw showing the population, fire-brigade staff, and cost in large towns in the United States, and in Paris and London, *App.* 429.

Summary by the Committee in connection with the estimates of Captain Shaw at the time of transfer of the brigade to the Metropolitan Board, *Rep.* iv——Consideration of the several sources of income in order to meet working expenses; deficit in several years owing to the charge involved in taking over the fire escapes, *ib.* vi, vii——Large additional expenditure involved in the proposed increase of staff, and of plant, *ib.* xii.

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Court Theatre. The Court Theatre is licensed by the Chelsea magistrates, *Hare* 1899, 1900——License of the theatre in the first instance without any previous inspection; inspection since the Brooklyn fire, when several alterations were made, as suggested by the magistrates, *ib.* 1901–1904. 1961, 1962.

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Criterion Theatre. Excellent provision for the safety of the audience of the Criterion Theatre, though this theatre is entirely underground; very large and fireproof entrances or passages to which the audience could at once retreat in case of fire, *Fane* 1132–1147. 1170–1176——Sufficiency of less than two minutes for clearing the Criterion of its audience, *ib.* 1258.

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Instance, in the case of the Criterion Theatre, of the opinion of the district surveyor having been over-ruled upon a question of construction, *Vulliamy* 3029—3035.

D.

Damage from Fire. Exception taken to a certain statement by Mr. Swanton as to the actual damage from fire in the case of insured property, *Hamlyn* 4705–4707——Practice of the brigade to include in the reports the total damage from all causes as well as fire, *ib.* 4716–4718.

Dickson, Alexander. (Analysis of his Evidence.)—Is Secretary to the Kent Waterworks Company, 4020——Description of the district of the company within the metropolitan area, there being 150 miles of streets, with pipes for water supply, of which thirty miles are under constant pressure, 4021–4025——Provision of some hydrants in the parishes of Woolwich and Greenwich at the request and at the expense of the parish authorities, 4026–4030——Circumstance of the Kent Company not having received any requisition from the Metropolitan Board till after the Act of 1871 to place plugs upon mains, 4031, 4032.

Communication from the Metropolitan Board to the Kent Company in July 1866, recommending the establishment of a constant high-pressure service; report sent at the same time from Captain Shaw, advocating constant service with a sufficient number of hydrants, 4033–4036——Letter from the company, in reply to the foregoing, submitting that there were fifty miles of mains under constant high pressure, and available for hydrants, 4037–4040.

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Correspondence between the Metropolitan Board and witness' company in December 1869 relative to the supply of water at a fire in Trinity-street, Rotherhithe, on 1st November 1869; much larger supply available if hydrants had been in use, 4060–4062——Instantaneous and large supply obtainable at a fire at the Kamptulicon works, Greenwich, in 1872, if hydrants had been previously laid down, 4063, 4064——Very large and continuous supply, by means of hydrants, at a fire near the Foreign Cattle Market in October 1872; 4065–4067.

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Special

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Docks. Satisfaction generally of the dock companies with the arrangements of the East London Waterworks Company as to pressure, *Greaves* 4006.

E.

East London Theatre. Detailed inspection on the part of the Lord Chamberlain before a license was granted to witness; careful inspection annually before renewal of license, *Abrahams* 2171–2174——Frequent alterations made in compliance with representations by the Lord Chamberlain, *ib.* 2175, 2176. 2318, 2319——Particulars relative to the number and character of the exits from the theatre; entire sufficiency thereof, *ib.* 2176–2186 2193–2200——Instance of alarm of fire in the theatre when very full, but without any casualty, *ib.* 2186–2189. 2296, 2297.

Facility of egress from the East London and Pavilion Theatres by means of extra doors readily available in case of panic; frequent use of these doors, which are well known to the public, *Abrahams* 2193–2201. 2270–2272—— Compliance of witness as far as possible

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possible with the Lord Chamberlain's regulations, though some of the requirements have involved heavy outlay, *Abrahams* 2202, 2203. 2315-2319. 2335, 2336——Protection of the first row of ground lights by wire, but not of all the ground row, *ib.* 2204-2208.

Reliance placed by witness upon all the mechanics in his theatres to act in case of any emergency; he does not employ any regular firemen, *Abrahams* 2210-2214. 2303-2309 —— Division wall in witness' theatres between the stage and the auditorium, carried up to the roof, *ib.* 2218, 2219——Fireproof construction of the passages, *ib.* 2220, 2221.

Satisfactory supply of water, together with hydrants; at each of witness' theatres, *Abrahams* 2237-2239. 2273——Very good storage for the properties, *ib.* 2258-2260—— Almost total absence of partitions, *ib.* 2404 —— Belief that the passages and division walls are brick, without any iron, *ib.* 2405, 2406.

EAST LONDON WATERWORKS COMPANY:

1. *Pressure available for Supply to Fires.*
2. *Mileage, and Number of Houses under Constant Supply.*
3. *Correspondence with, and Action of, the Metropolitan Board relative to Constant Supply, and the Application of Hydrants.*
4. *Check to Waste under Constant Supply.*
5. *Private Hydrants.*
6. *Other Details generally.*

1. *Pressure available for Supply to Fires:*

Reference to a map as showing the area supplied by the company, the levels being shown by a model; very uniform level, the larger portion of the district being from thirty to forty feet above Trinity high-water mark, *Greaves* 3515-3521——Division of the company's district into three separate portions, worked as different levels; particulars as to the pressure in each district, *ib.* 3539-3552——Intercommunication between the different levels, and facility thereby for regulating the pressure, *ib.* 3549, 3550. 3553, 3554.

Opinion as to the sufficiency of the statutory level or pressure of forty feet, at which the East London Company are bound to deliver to consumers, *Greaves* 3572, 3573. 3575 ——System of gauges by which continuous information is provided as to the pressure in the pipes throughout the day, *ib.* 3574—— Large number of factories supplied by the company, the present pressure operating very satisfactorily, *ib.* 3575. 3608.

Consideration of the results shown by certain experiments of Sir Joseph Bazalgette as to the pressure available at different points of the company's district; respects in which these tests do not fairly indicate the pressure, *Greaves* 3584-3604 —— Practice of regulating the pressure in each district according to the requirements, and of keeping the pressure under what may be given; expediency of this plan, *ib.* 3605-3608——Admission as to the pressure in parts of the company's district being less than forty feet, in which places hydrants would not be of much use at present, *ib.* 3852-3856. 3866.

Circumstance of the statutory pressure of the East London Company being less than that of any other London water company; obligations on the other hand of the former company as to supplies to large consumers, *Greaves* 3920-3924——Large and lofty buildings in the company's district, although the pressure is comparatively low, *ib.* 3921-3924.

Further evidence relative to the numerous large and lofty buildings along the river side in the company's district, and the pressure at which water may be applied to these in the event of fire, *Greaves* 3934-3954——Explanations with further reference to the system of gauges for recording the pressure in the East London district throughout the day and night; decrease of pressure during the night, *ib.* 3992-3999.

Facility of providing better pressure during the night in connection with a proper supply of hydrants, *Greaves* 4000-4002——Great improvement in the pressure, as compared with former years, *ib.* 4004, 4005.

Particulars relative to the pressure at various points of observation, and the height to which the water may be presumed to rise, *App.* 410.

2. *Mileage, and Number of Houses under Constant Supply:*

Information as to the mileage of mains, and of branches constantly supplied under pressure, these being available throughout for hydrants, *Greaves* 3578-3583——Progressive extension of constant supply in the company's district since 1852; total of about 35,000 houses placed under constant supply previous to the compulsory powers given by the Act of 1871, *ib.* 3633-3635. 3652——Further and large extension of constant supply under the powers of this Act, *ib.* 3633.

Further particulars as to the large and increasing mileage of mains and service pipes of the East London Company under constant supply; this system will probably be completed over the whole district in the next five years, *Greaves* 3680-3699. 3759.

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EAST LONDON WATERWORKS COMPANY—continued.

3. *Correspondence with, and Action of, the Metropolitan Board relative to Constant Supply, and the Application of Hydrants:*

Examination relative to correspondence between the East London Company and the Metropolitan Board since 1871, upon the question of the latter applying hydrants to the mains and services of the company under constant supply, *Greaves* 3654–3685.

Statement by witness' company in 1866, as to their being prepared to carry out the obligations imposed by Parliament in regard to constant supply; no requisition to this effect has hitherto been made by the Metropolitan Board, *Greaves* 3988–3991.

Comment upon the omission of the Metropolitan Board to communicate with witness' company as to the results of the inquiry made by the former in 1873, in regard to the working of constant supply in the company's district, *Greaves* 4006, 4007.

Correspondence between the East London Company and the Metropolitan Board of Works in the years 1872–76, with reference chiefly to the large mileage under constant supply in the company's district, and the question of an extended application of hydrants; complaints by the company as to the inaction of the Board in utilising constant pressure in reference to fires, *App.* 416–428.

4. *Check to Waste under Constant Supply:*

Regulation of fittings by the company so as to provide against undue waste; that is, by restricting the aperture in the house pipes by the insertion of a small disc, *Greaves* 3636–3639.

5. *Private Hydrants:*

Explanation that the East London Company are not bound to supply hydrants in private use, and do not receive any payment in respect of them, *Greaves* 3927–3931——Limited extent to which any advice is given, or any conditions required by the company in connection with the provision of private hydrants, *ib.* 3963, 3964.

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Total of about 90,000 houses supplied by the company, *Greaves* 3522-3524——Supply of water procured from the River Lea, exclusively, till a few years ago, a portion of the supply being now taken from the Thames, *ib.* 3525-3527——Storage of a limited quantity of water in a reservoir recently constructed on Hornsey Wood Hill, at a height of about 140 feet, *ib.* 3527–3531.

System of supply entirely by pumping, there being none by gravitation; explanation hereon that the same result is produced by continuous pumping, as though the supply were from reservoirs, *Greaves* 3532–3538——Necessity of lifting the Thames water to the reservoir which is used for the upper level or northern district, *ib.* 3551. 3555-3558——Total delivery of from 26,000,000 to 27,000,000 gallons daily, all the water being filtered, *ib.* 3559–3562——Varying hourly supply throughout the day, the maximum per-centage of supply being in the hour from nine to ten a.m., *ib.* 3563–3571.

Information as to the quantity of water used at fires in the last ten years as compared with the whole of the company's supply; average of less than a quarter per cent. supplied at fires, *Greaves* 3612–3619——Reference to a Table showing the length of time for which the plugs were out at fires, *ib.* 3620, 3621——Difficulty of increase of dividend beyond six per cent., *ib.* 3961.

Statement showing for 1874, 1875, and 1876 certain particulars as to the duration of fires, the time for which fire-plugs were drawn, &c., *App.* 402——Statement showing the number of fires at which the turncocks or the fire brigade arrived first in each of the years 1868–76, *ib.* 403, 404——Hourly per-centage of supply as given by the company during the twenty-four hours of each day, *ib.* 404.

Quantity of plugs sent out half-yearly to all the district of the company since 1859; *App.* 405——Number of plug-pipes issued yearly since 1851; *ib.*——Return showing the supply of gallons per minute on the 15th and 16th June 1876; also the total daily supply in each district, *ib.* 406.

Efficiency of Brigade. Due care taken by the fire brigade not to leave the scene of any fire until the danger is entirely suppressed, *Greaves* 3965, 3966.

Dissent from certain evidence of Mr. Swanton as to the relative efficiency of the brigade before and since its transfer to the Metropolitan Board, *Hamlyn* 4701–4704.

Concurrence of evidence before the Committee as to the promptitude, courage, and energy of the men, and as to the skill with which they are handled by their officers, *Rep.* vii——More efficient working of the engines and fire-escapes if the number of men were not so limited, *ib.* ix.

See also *Hours of Duty. Recruits. Strength of the Brigade. Superannuation.*

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Egyptian Hall. Advantage if places like the Egyptian Hall or St. James's Hall were under the same authority as theatres; dangerous exit from the former, *Hollingshead* 2526–2528——Great danger in the event of fire or panic at the Egyptian Hall, *Vulliamy* 3095, 3096.

Engineers (*Fire Brigade*). Grounds for the conclusion that the engineers in charge at important stations should have some distinct position assigned them in the absence of the superintendent, *Hamlyn* 4736–4742.

Engines. Little, if any, demand for fire engines, if hydrants be placed at a distance of every seventy or eighty yards, and if the police be provided with hand pumps, *Fraser* 431, 432——Objection to fire engines being dispensed with in the City, though extensive fires will be guarded against by means of hydrants, *Shuter* 498, 499. 548, 549——Concurrence in the view that fire engines should be retained in addition to hydrants, *Cates* 722–724. 729–735. 738; *Haywood* 886–889.

Limited extent to which the cost of the fire brigade may be reduced by putting down hydrants; the existing engines and staff should, in fact, be retained, but the engines would not be so often required, *Muir* 3265. 3409, 3410. 3430–3434. 3460–3464. 3477, 3478. 3504–3506——Opinion that the number of fire engines should have reference to the area rather than to the population, *ib.* 3265. 3394, 3395——Circumstance of there being more engines in Manchester, in proportion to the area, than in London, *ib.* 3265.

Explanation that in London hydrants cannot be substituted for fire engines, as the latter must still be retained, unless it were possible to greatly increase the pressure on the mains, *Muir* 3315, 3316——Contemplated retention of fire engines in London, even if hydrants be only thirty-five yards apart; that is, unless an increased pressure be provided, *ib.* 3468–3484.

Explanation that witness does not propose to entirely do away with engines, though he considers that in the great majority of cases they would be practically superseded by an efficient system of hydrants, *Greaves* 3809–3815——Engines are still retained by the Government authorities at Deptford and Greenwich, in addition to hydrants, *Dickson* 4374, 4375.

Similar practice in 1865 as at present in regard to keeping several engines at the same stations, *Hamlyn* 4727–4730——Doubt as to any reduction being desirable in the number of engines, as the result of a system of hydrants, *Shaw* 4981–4990.

See also *Manual Engines.*

EXETER HALL:

1. *Danger in the event of Fire and Panic.*
2. *Entrances and Exits; Passages and Staircases.*
3. *Arrangements for Fire Extinction.*
4. *Other Details generally.*

1. *Danger in the event of Fire and Panic:*

Reference to Exeter Hall as said to be especially dangerous, *Marquis of Hertford* 2693——Danger in case of panic in Exeter Hall, *Vulliamy* 3095, 3096.

Opinion that there is no building in London holding a large audience so badly constructed as Exeter Hall with reference to escape from fire, *Mitchell* 3147. 3212, 3213. 3223. 3237.

Instance of a large fire in Savoy-street, close to the hall, at a time when the latter was filled by a large audience; catastrophe if news of this fire had reached the audience, and had caused a panic, *Mitchell* 3158–3160. 3213–3231——Panic sure to result if a fire were to break out in the buildings on the northern side of Exeter-street, *ib.* 3162, 3163. 3213——Danger through some of the lower rooms in the Hall being used as offices, *ib.* 3200, 3201.

2. *Entrances and Exits; Passages and Staircases:*

The entrances are from the Strand and Exeter-street, the former entrance opening into a corridor twenty-two feet wide, and the latter leading into a corridor by a passage ten feet wide, *Maberley* 2824–2834——Width of only five and a half feet at the door in Exeter-street; facility of enlargement, *ib.* 2832–2834. 2912–2916. 2923–2926——Three staircases from the ground to the hall; particulars as to their width, &c., *ib.* 2835–2839. 2855, 2856——Additional exit available by converting a window into a doorway, *ib.* 2844–2848.

Consideration of suggestions for an increased number of staircases and of exits; means of improvement in this respect, but at a considerable expense to the proprietors, *Maberley* 2879 *et seq.*——Considerable height of the hall above the level of the entrances; recent strengthening of the staircase leading to the hall, *ib.* 2957–2964——Degree of danger

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EXETER HALL—continued.

2. *Entrances and Exits; Passages and Staircases*—continued.

through the audience converging at a certain point on their way out, *Maberley* 2972–2976——Special staircases for the performers, *ib.* 3013, 3014.

Entire inadequacy of the two modes of exit now provided; that is, in the event of fire or panic, *Mitchell* 3148. 3157–3164. 3223–3225. 3235. 3237——Explanation as to witness having suggested (when serving as one of the directors of the Exeter Hall concerts), that a new exit should be made into the northern end of Exeter-street; facilities of egress thereby in case of fire or panic, *ib.* 3153–3156. 3191, 3192. 3214——Improvement if the two narrow doors going under the orchestra from the large hall were widened, *ib.* 3174–3176.

Explanation as to the directors or the proprietors of the hall not having taken any steps for carrying out the additional exit suggested by witness; comparatively small expense involved, *Mitchell* 3177, 3178. 3202–3207. 3218–3222——Total of fifty steps in the staircase leading from the Strand to the hall, *ib.* 3184, 3185——Disadvantage of the varying width of the staircases; great liability to a block where they are narrow, *ib.* 3186, 3187. 3235, 3236.

Practice of fastening back the main doors so as to keep them open, the next doors being swinging doors opening both ways, *Mitchell* 3187–3190——Conversion of a certain window on the Exeter-street side into a door as a means of exit when concerts are over, *ib.* 3193–3196. 3211——Limited advantage by widening the staircase leading to the western exit in Exeter-street, *ib.* 3208–3211.

3. *Arrangements for Fire Extinction:*

Examination as to the water supply and as to the provision made by means of buckets, there being no hydrants: question whether great improvement is not needed on this score, *Maberley* 2866–2878. 2977–2991. 3008–3012. 3015–3017——Ready discovery of any fire, watchmen being always employed by night and by day, *ib.* 2933–2936.

Very insufficient water-supply arrangements at Exeter Hall, *Vulliamy* 3113——Exceedingly defective arrangements within the hall for the extinction of any fire that might arise, *Mitchell* 3179–3183.

4. *Other Details generally:*

Explanation of the plans of the building, *Maberley* 2822, 2823——Accommodation in the hall for about 3,000 persons who can all be out of the building in less than ten minutes, *ib.* 2840–2843——Information relative to the construction of the buildings and the materials used; safety on this score, *ib.* 2849–2854. 2857, 2858. 2899. 2937, 2938——Modes of lighting; precautions in this respect, *ib.* 2859–2865. 2940–2942. 2944–2946. 3003, 3004.

Absence of panics at accidents hitherto; belief that in case of panic the hall is quite as safe as any theatre, *Maberley* 2880–2884. 2888, 2889. 3002——Information as to the insurance, the rate (2*s.* per cent.) being much less than in case of theatres, *ib.* 2906–2911. 3005–3007——Paucity of staff for seeing to the doors, &c., in case of fire; special instructions to the police, *ib.* 2917–2921. 2939.

Use of the cellars under the hall by a wine and spirit merchant; absence of danger from this quarter, *Maberley* 2947–2956——There is no warming except by the gas lights, *ib.* 2965–2967——Recent inspection of the building on the part of the Lord Chamberlain; belief that a report was made, *ib.* 2997–3001.

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F.

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Hollingshead, John. (Analysis of his Evidence.)—Is lessee of the Gaity Theatre; gave evidence before the Select Committee of 1866; 2407, 2408——Improvement if there were a responsible public department for the survey of theatres as regards construction,

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2409, 2410——Importance of music and concert halls being subject to the same system of survey as theatres; two-fold capacity of the former as compared with the latter, 2410–2417. 2419——Expediency of direct responsibility in the licensing authority, 2418–2420——Opinion that the same department should be entrusted with the surveying and the licensing, as by enlarging and strengthening the Lord Chamberlain's Office, 2421–2423.

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Information relative to the construction of the Gaiety Theatre and the materials used; excellence of the precautions against spread of fire, 2438–2448——Specially low rate of insurance of witness' theatre, 2443——Advantage generally of separate exits into the street for the different parts of the audience, 2449, 2450——Advantage also in the passages increasing in width towards the exit, 2451——Expediency of the Lord Chamberlain having power to prosecute and punish for breach of regulations, without necessarily withholding the license, 2452–2456.

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Hotels. Advantage if large hotels (as well as theatres, churches, &c.) were subject to some inspection in reference to precautions against fire, *Marquis of Hertford* 2810–2812.

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Strong complaint on the part of the brigade as to Mr. Swanton's statement in 1876 in regard to the lightness of the labour in the force, *Hamlyn* 4733–4735——Repetition of former statements as to the laborious work of the men; entire disagreement with Mr. Freeman on this point, *Shaw* 4938–4942.

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HYDRANTS:

1. *Concurrence of Evidence as to the Great Value of Hydrants in the Metropolis, more especially in connection with Constant Supply and High Pressure.*
2. *Objections on the part of the Metropolitan Board.*
3. *Expense.*
4. *Number of Hydrants required.*
5. *Different kinds of Hydrants, and mode of Laying Down.*
6. *Greater Facility in obtaining Water, and less Waste, by the use of Hydrants, than of Fire-plugs.*
7. *Question of Dispensing with Engines.*
8. *Use to be made of the Police in connection with a System of Hydrants.*
9. *Private Hydrants.*
10. *Effect as regards Insurance Rates.*
11. *Conclusions and Recommendations of the Committee.*

1. *Concurrence of Evidence as to the Great Value of Hydrants in the Metropolis, more especially in connection with Constant Supply and High Pressure:*

Great value of hydrants even if the water were delivered at an exceedingly low pressure; that is, as enabling immediate application of water upon the first outbreak of fires, *Chadwick* 14, 15——Large saving of water and administrative expense by substituting the constant system, with hydrants, for the present system, with engines, *ib.* 49, 50——Consideration of the pressure now available for throwing jets of water at fires, witness further submitting that hydrants would be exceedingly useful, even with intermittent supply and low pressure, *ib.* 165-184. 197, 198. 293–298.

Necessity of a constant supply at high-pressure in order to properly work a system of hydrants, *Fraser* 337. 360. 441, 442——Conclusion as to the expediency of an extension of the hydrant system in the metropolis, *Cates* 716.

Importance attached to hydrants if the mains are sufficiently large and if the pressure is as good as that in the city, *Haywood* 834–843. 856. 877, 878. 901-905. 911——Considerable mileage of mains, not only of the New River Company but of other companies under constant supply and available for hydrants, *ib.* 895–898——Special value of hydrants where houses are very close together, and where property is most valuable, as in the City, *ib.* 900. 910.

Doubt as to the pressure given in the metropolis generally, that in the City being very effectual in connection with hydrants, *Haywood* 901-905. 921-924——Approval of hydrants being put down where the population is very dense, without waiting till a constant supply is given throughout the metropolis, *ib.* 928–931.

Large jet of water available day and night by placing a hydrant every 180 yards (as intended) upon the constantly-charged mains throughout the City, *Muir* 3310-3315——Effect of the friction of the hose in reducing the jet delivered by the hydrant, *ib.* 3314, 3315. 3365. 3429, 3430——Advantage, as regards hydrants, if the service pipes were constantly charged, though it would be a great improvement to place them at once upon the constantly-charged mains, *ib.* 3347-3349. 3500, 3501——Importance attached to hydrants for the immediate obtainment of water, even though the pressure may not be sufficient to enable them to throw a jet, *ib.* 3388-3393. 3410. 3463.

Views of witness strongly in favour of the universal laying down of hydrants, even with the existing pressure, and with constant supply only partially provided, *Greaves* 3676-3668. 3710, 3711. 3796——Sufficient strength of the East London Company's pipes for the constant high pressure required for hydrants, *ib.* 3756–3759——Prevention of a large proportion of fires by the instant application of water by means of hydrants, *ib.* 3760-3762——Dissent from Mr. Bramwell as to the uselessness of hydrants with a very low pressure, *ib.* 3925.

Very large and continuous supply by means of hydrants at a fire near the foreign cattle market in October 1872, *Dickson* 4065-4067——Concurrence of evidence before the Select Committee of 1871 as to the expediency of hydrants in connection with constant supply, *ib.* 4087-4089——Result of the experience gained from hydrants in the Kent Company's district that in the great majority of cases fires would be extinguished without engines being required, *ib.* 4198-4203.

Quotation of the views of Captain Shaw as to the great value of hydrants with standpipes placed on mains constantly charged at high pressure, *Dickson* 4379, 4380——Conclusion of the Select Committee of 1871 as to the importance of hydrants in connection with constant-supply mains, *ib.* 4381, 4382.

Concurrence in the view as to the value of hydrants upon the constantly-charged mains in facilitating and increasing the supply of water at fires, *Shaw* 4796-4803. 4812, 4813——Importance of hydrants even where there is not constant supply with high pressure; that is, if the expense be no difficulty, *ib.* 5011, 5012.

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HYDRANTS—continued.

2. *Objections on the part of the Metropolitan Board:*

Entire dissent from the conclusion of Sir Joseph Bazalgette that under the present conditions of water supply hydrants would be useless in the metropolis for the prevention of fires, *Chadwick* 14.

Comment upon the objections of the Metropolitan Board to act upon the recommendations of the Select Committee of 1871 in favour of the adoption of hydrants, *Greaves* 3648. 3650 *et seq.*——Statement by the Board to the effect that hydrants were no better than plugs, and were of no use, *ib.* 3651.

Examination showing that the objections of the Metropolitan Board to laying down hydrants are based upon the insufficiency of pressure under the present conditions of supply, *Greaves* 3857–3860.

3. *Expense*:

Grounds for the conclusion that there is much exaggeration as to the cost at which hydrants may be laid down throughout the metropolis; estimated cost of about 3 *l.* per hydrant, *Chadwick* 42–48——Further considerations as to the expediency of laying down hydrants throughout the metropolis, and as to the cost to be incurred; cost of about 3 *l.* per hydrant in Manchester and Glasgow, *ib.* 134–137. 179–196. 293–304——Decided economy by placing hydrants throughout the metropolis at an average of fifty yards apart, if the work can be done for a quarter of a million sterling, *ib.* 299–304.

Very large outlay involved in laying down hydrants throughout the metropolis, such outlay not being justifiable unless there were a constant supply, *Shuter* 527–530. 541–543——Question considered whether efficient hydrants may not be laid down for much less than 30 *l.* or 25 *l.*, including branch mains and all other expenses, *ib.* 563–570. 591, 592——Increased expense in putting down hydrants where there is asphalte pavement, *ib.* 573–575.

Variation in the case of hydrants from 1 *l.* 14 *s.* to 24 *l.* a-piece; great difference in the construction and quality, *Haywood* 831. 861–863. 919, 920——Objection to the adoption of hydrants at 3 *l.* a-piece, as compared with the sluice-valve hydrant, *ib.* 864–868——Expense necessary in the periodical inspection or testing of hydrants, and in their maintenance, *ib.* 876. 890——Useful hydrant to be obtained for about 4 *l.*, though it is proposed to adopt a better one in the City, *ib.* 884–886.

Cost of 3 *l.* 18 *s.* 3 *d.* for the hydrant approved by the Metropolitan Board; average of about 10 *l.* for each hydrant, including the fixing, *Muir* 3339–3346——Great expense in breaking up and re-laying the pavement in some places, and in working at night, so that the cost would probably approach 20 *l.* in these cases, *ib.* 3341–3345. 3437.

Calculations in detail with further reference to the number and cost of hydrants if applied throughout the metropolis; very large outlay required if they be placed within thirty-five yards of each other, and if the pressure be increased so as to enable engines to be entirely dispensed with, *Muir* 3435–3445. 3456–3459. 3468–3495——Large expense necessary for branch mains with constant supply in connection with an efficient system of hydrants, *ib.* 3441–3445.

Particulars in connection with various kinds of hydrants, and the cost in each case, *Greaves* 3724–3755——Estimate of 6 *l.* 10 *s.* per hydrant as the cost at which ball hydrants could be laid down all over the East London Company's district, including the cost of breaking the pavement, and of fixing, &c., *ib.* 3744–3755——Conclusion that the outlay required for the provision of hydrants throughout the metropolis would soon be covered by the large saving effected in the damage from fires, *ib.* 3825–3827. 3847——Expediency of the cost of a system of hydrants falling upon the metropolitan rates, *ib.* 3846, 3847.

Low price of some hydrants suggested by witness as compared with the cost of those laid down by the City authorities; increased charge if the former be laid by the side of the street instead of in the middle, directly on the main, *Greaves* 3882–3889——Reference to a certain inexpensive hydrant as being in very extensive use, *ib.* 3926——Exceedingly judicious outlay in spending half a million for the supply of hydrants in London, *ib.* 4016.

Particulars relative to the different kinds of hydrants erected by the Kent Waterworks Company at the request of the Metropolitan Board, and the cost in each case; selection by the Board of Messrs. Guest & Chrimes 2½-inch ball-hydrant, the cost being 4 *l.* 15 *s.*, *Dickson* 4115–4136——Increased cost, as compared with that at Manchester, on account of the hydrants having been placed upon saddle-pieces on the mains, *ib.* 4134–4136. 4190, 4191——Details as to the cost in the Plumstead district; average of 3 *l.* 6 *s.* 11 *d.* per hydrant, exclusive of standposts, *ib.* 4178–4192——Greater cost for paving and road repairs in connection with the hydrants in the Rotherhithe district than in Plumstead, *ib.* 4188–4190.

Estimate

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HYDRANTS—continued.

3. *Expense*—continued.

Estimate of 12 *l.* 7 *s.* 6*d.* for each hydrant, including the cost of laying, &c.; proposed use of the sluice-valve hydrant, *Hack* 4523-4525. 4529-4534——Great variation in the cost of hydrants, the expense in the City being very heavy, *Shaw* 4991-4994.

4. *Number of Hydrants required:*

Disadvantage in placing hydrants more than eighty yards apart on account of the greater length of hose required, *Shuter* 573-575——Explanation that witness does not contemplate the placing of hydrants in the suburbs or in places where the population and houses are not more or less dense, *Hayward* 838-841. 875. 889. 900. 910——Conclusion that by placing hydrants sixty yards apart throughout the metropolis the requirements of Captain Shaw may, on the whole, be fairly met, provided the water companies give the necessary pressure, *ib.* 935-941.

Judgment necessary in distributing hydrants, as they should be much more close together in the centres of property than in the suburbs, *Muir* 3415, 3416. 3487-3495——Approval of hydrants being 180 feet apart, *Greaves* 3763. 3891——Explanation as to the distance apart at which the hydrants have been placed in Plumstead; maximum of 200 yards, *Dickson* 4168-4177.

5. *Different kinds of Hydrants, and mode of Laying Down:*

Efficient action of ball hydrants, if of good workmanship, *Chadwick* 46——Advantage of hydrants with sluice-valves as compared with those having disc-valves, *Shuter* 547. 553—— Advantage of hydrants in the shape of fixed posts, *Cates* 747—— Explanation that the hydrant exercises no power as regards pressure, but acts merely as a conductor between the main and the hose, *ib.* 753-756——Preference expressed for sluice-valve hydrants, though not nearly so cheap as those in use at Manchester, *Haywood* 932-934——Objection to hydrants in the centre of the roadway, *Muir* 3418-3420.

Approval of the ball-hydrant if it can be retained in the middle of the street, as at Birmingham, without interfering with the traffic, *Greaves* 3729-3735. 3840-3843——Advantage on the whole in hydrants being placed at the side rather than in the middle of streets where there is much traffic, *ib.* 3841-3843——Further statement as to the degree of interference with the traffic by placing hydrants directly on the mains in the middle of the street, *ib.* 3909-3919.

Objection to hydrants which require standposts being placed in the roadway instead of the pathway, *Dickson* 4191, 4192. 4197——Necessity of a standpost for a ball-hydrant but not for a sluice-valve hydrant, *ib.* 4193-4197——Contemplated fixing of hydrants upon service-mains where mains are not laid down, *Hack* 4542-4545.

6. *Greater Facility in obtaining Water, and less Waste, by the use of Hydrants, than of Fire-plugs:*

Better facilities in obtaining water by means of hydrants than of plugs, irrespectively of the pressure, *Chadwick* 14, 15; *Haywood* 911; *Muir* 3388-3393. 3410. 3463——Great waste of water at fires; this would be obviated by the use of hydrants, *Fraser* 407-409——Large saving of damage through the facility of at once applying hydrants without waiting for turncocks, *Shuter* 500, 501——Less consumption of water at fires by the use of hydrants, *Haywood* 925.

Several important advantages of hydrants as compared with plugs, in reference to the supply of water at fires; special advantage in the former being placed on the main, and being instantaneously available, *Muir* 3299-3304. 3316-3319——Much larger delivery of water by means of a hydrant than a plug, *ib.* 3303, 3304——Function of the hydrant not to supersede the fire-engine, but the turncock, *ib.* 3327, 3328——Value of hydrants as a means of promptly obtaining water, independently of high pressure, *ib.* 3356-3358——Better pressure with a hydrant than with a plug, the former having the larger area, *ib.* 3417.

Conclusion that under any conditions plugs are inferior to hydrants, and that the latter should be substituted for the former, *Greaves* 3710-3717——Facility with which the firemen may at once put the hydrants into operation, *ib.* 3848-3850——Great importance further attached to the prompt application of water at the first outbreak of fires, *ib.* 3895, 3896.

Value of hydrants in diminishing waste of water at fires, and in saving the wear and tear of engines, *Dickson* 4203, 4204. 4208, 4209——Better facility of concentrating the supply in the case of hydrants upon the mains, than in the case of plugs upon the services; necessity of retaining the services of turncocks for this purpose, *ib.* 4284-4287——Avoidance of waste by placing hydrants on constantly charged mains, *Shaw* 4810, 4811.

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HYDRANTS—continued.

7. *Question of Dispensing with Engines:*

Objection to engines being dispensed with, or to hydrants being relied upon exclusively, *Shuter* 498, 499. 548, 549; *Cates* 722–724. 729–735. 738; *Haywood* 886–889; *Greaves* 3809–3815——Calculation as to the great increase of pressure required, and the great expense involved, if hydrants are to be used exclusively, in lieu of fire engines; conclusion that fire-engines must still be retained, *Muir* 3265. 3409, 3410. 3430–3434. 3460–3464.

8. *Use to be made of the Police in connection with a System of Hydrants:*

Proposed use of the hydrants by the police, pending the arrival of the fire brigade; contemplated drilling of the police in the use of the apparatus, *Shuter* 502, 503. 555——Advantage in hydrants being instantly utilised by the police when a fire breaks out; exceedingly little drill necessary for this purpose, *Haywood* 835–837. 839. 873, 874. 990–892.

9. *Private Hydrants:*

Extensive provision of hydrants by the docks, and by numerous manufacturers in the East London District; no extra pressure is given, *Greaves* 3765–3781. 3894——Precaution being taken in many factories by placing hydrants on the different floors, *ib.* 3952.

10. *Effect as regards Insurance Rates:*

Conclusion as to lower insurance rates being charged where there are hydrants, *Greaves* 4014–4016.

11. *Conclusions and Recommendations of the Committee:*

Very simple character of the operations involved in attaching the hose, and applying the water where hydrants are provided; absence of waste, *Rep.* xvii——Advantage of a hydrant over a fireplug for the mere feeding of the engine, *ib.* xvii, xviii——Great value of hydrants as at once applying water, without the intervention of fire-engines, *ib.* xviii.

Power of the Metropolitan Board under the Water Act of 1871, to cause hydrants, instead of plugs, to be placed on any mains or pipes, at the cost of the Board, *Rep.* xviii——Complaints on the part of the companies, notably the East London and Kent Companies, as to the persistent refusal of the Metropolitan Board to incur the cost of affixing hydrants to the constantly charged mains, *ib.* xviii, xix——Objection by the Metropolitan Board to an extension of hydrants throughout the metropolis, as being of doubtful advantage under the present conditions of the water supply, whilst the cost would be enormous, *ib.* xix.

Considerations as to the cost per hydrant, and as to the number required; great variation in the estimates on the subject, *Rep.* xix——Respect in which constant supply is better than intermittent supply, in reference to the working of hydrants, *ib.* xix, xx.

Conclusion that the conditions required by the Metropolitan Board as essential for the efficient working of hydrants are realised beyond question in parts of the metropolis, *Rep.* xx, xxi.

Constant supply and adequate pressure in the City and elsewhere, hydrants having already been laid down in parts of the City, in the Temple, and in portions of the district of the Kent Waterworks Company, *Rep.* xx, xxi.

Decided opinion of the Committee that the Metropolitan Board should at once lay down hydrants in many parts of London, though not applicable to the metropolis as a whole, *Rep.* xxi——Special advantage of hydrants as admitting of the prompt application of water at the outset of fires, *ib.*

Necessity of the police being more extensively utilised at fires in connection with a system of hydrants, *Rep.* xxii——Recommendation that if the police be utilised as proposed by the Committee, hydrants should be placed on mains and service pipes, wherever a constant supply is given, *ib.*

Full compensation for the large outlay involved by the increased security to property, *Rep.* xxii——Importance at the same time of the introduction of constant supply, increase of pressure, and enlargement of pipeage, as necessary conditions of an efficient working of an extended system of hydrants, *ib.*

Conclusion of the Committee that hydrants should, without delay, be affixed to mains and service pipes wherever there is constant supply, and should follow the extension of such supply, *Rep.* xxix.

See also *Birmingham. City of London*, 3, 4. *Cost. East London Waterworks Company*, 3. *Engines. Glasgow. Kent Waterworks Company. Manchester. New River Company. Street Cleaning. Temple, The. Water Supply.*

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I.

Inner Temple. See *Temple, The.*

Insurance Companies. Contemplated exemption of the fire insurance companies from any charge for fire prevention, *Chadwick* 93. 95.

Increase from 11,050 *l.* in 1866 to 18,905 *l.* in 1876 in the insurance companies' contribution, *Rep.* vi.

Consideration by the Committee of the origin and amount of the contribution paid by the insurance companies; conclusion that no sufficient cause has been shown for augmenting the rate of contribution, *Rep.* xxiii.

Conclusion that the contribution from the insurance companies should be continued at the present rate, and that a charge should be levied on owners of the insured property saved from fire, *Rep.* xxix.

See also *Hydrants*, 10.

Intermittent Supply. See *Hydrants. Water Supply.*

K.

Kamptulicon Works. Instantaneous and large supply of water obtainable at a fire at the Kamptulicon works, Greenwich, in 1872, if hydrants had been previously laid down, *Dickson* 4063, 4064.

KENT WATERWORKS COMPANY:

1. *Pressure given in the Company's District; Mileage under Constant Supply.*
2. *Action of the Metropolitan Board in reference to Constant Supply and the Provision of Hydrants; Complaints on the part of the Company.*
3. *Correspondence with the Metropolitan Board relative to the Attendance of Turncocks, &c.*
4. *Extent to which Hydrants have been provided; satisfactory Results obtained.*
5. *Facility in altering the Fittings for Constant Supply.*
6. *Other Details generally.*

1. *Pressure given in the Company's District; Mileage under Constant Supply:*

Description of the district of the company within the metropolitan area, there being 150 miles of streets with pipes for water supply, of which eighty miles are under constant pressure, *Dickson* 4021-4025——Particulars as to the altitude of the several reservoirs, the capacity of each reservoir, and the pressure given, *ib.* 4210-4227——Pressure during the night entirely by gravitation, the engines ceasing to pump, *ib.* 4212-4214——Means of largely increasing the pressure in the lower districts, though this would be inadvisable on account of the strain upon the pipes, *ib.* 4219-4222.

Examination in detail with further reference to the pressure given in the constantly supplied districts of the Kent Company; correction of certain evidence of Sir Joseph Bazalgette on this subject, *Dickson* 4290 *et seq.*——Explanation that the reported loss of pressure in some service pipes is due to the fact that the pipes were under intermittent supply and were not charged during the night, *ib.* 4300-4304——Results of various experiments upon the question of loss of pressure by friction through hose of different lengths; conclusion as to the very satisfactory pressure obtained, *ib.* 4304-4314.

More even and reliable pressure by night than by day, the former pressure being entirely by gravitation; results of experiments on this point, *Dickson* 4316-4329—— Facility of increasing the night pressure if necessary, *ib.* 4320.

Explanations with further reference to the pressure given by witness' company, and the diminution caused therein under different circumstances; respect in which Sir Joseph Bazalgette has been inaccurate on this subject, *Dickson* 4383-4439 ——Means of supplying water for fires at night in certain districts of the company now under intermittent supply where there is no pressure at night, *ib.* 4397-4399——Satisfaction expressed by Captain Shaw with the pressure shown in the working of a hydrant in York-street, *ib.* 4418, 4419.

Impracticability of increasing the pressure in the low level districts by supplying the reservoirs in such districts from the high level reservoirs; necessity of direct supply from the latter to the lower districts, *Dickson* 4441-4443—— Very little valuable property in the districts where the pressure is lowest, *ib.* 4451-4453.

Particulars relative to the pressure at various points of observation and the height to which the water may be presumed to rise, *App.* 407.

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KENT WATERWORKS COMPANY—continued.

2. *Action of the Metropolitan Board in reference to Constant Supply and the Provision of Hydrants; Complaints on the part of the Company.*

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Letter from the company to the Metropolitan Board in August 1869 submitting that it is the duty of the latter to provide apparatus for the effective use of the water at fires, and that hydrants might be largely provided in the company's district with excellent results, *Dickson* 4050–4055.

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KENT WATERWORKS COMPANY—continued.

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MUSIC HALLS:

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3. *Risk of Danger from Fire.*
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4. *Means of enforcing Regulations:*

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Grounds

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MUSIC HALLS—continued.

4. *Means of enforcing Regulations*—continued.

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5. *Question of placing Music-halls under the same Inspection and Survey as Theatres in regard to Construction:*

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Conclusion that there is no sufficient architectural inspection, and that each applicant should have a certificate of the structural fitness of the building, *Pownall* 1825-1830. 1856, 1857——Very trifling inspection required in the great majority of cases in which music licenses are granted to public-houses; important distinction between these cases and those in which licenses are granted for music and dancing or other entertainment, *ib.* 1831-1838——Opinion that there is no necessity for a Government inspection before the grant of music licenses, *ib.* 1832, 1833——Effect of any general rules as to construction to shut up many places having these licenses, *ib.* 1839-1841.

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Non-objection to music-halls being placed under survey, as well as theatres, *Abrahams* 2291-2293——Importance of music and concert halls being subject to the same system of survey as theatres; twofold capacity of the former as compared with the latter, *Hollingshead* 2410-2417. 2419——Distinction between music-halls and theatres as regards the entertainments given and the system of licensing, witness further submitting that both should be under the same authority, and that a very effective one, *ib.* 2489-2494. 2509, 2510. 2526.

Conclusion as to the expediency of a survey and inspection of all music-halls, the duty being entrusted to the district surveyors, *Villiers* 2558-2564. 2580, 2581——Approval of similar regulations being applied by the magistrates to music-halls as are laid down by the Lord Chamberlain for theatres, *ib.* 2565-2567. 2582.

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6. *Objections to the Licensing of Music-halls by the Lord Chamberlain:*

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Disapproval of the very large number of music-halls in London being placed under the Lord Chamberlain; control urgently required, however, as regards these places, *Marquis of Hertford*, 2691. 2699-2702. 2732, 2733——Objection to responsibility as to music-halls, but not as to the London theatres, *ib.* 2815-2817.

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MUSIC-HALLS—continued.

7. *Conclusions and Recommendations of the Committee:*

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N.

New River Company. Higher pressure given by the New River Company (which supplies the Temple hydrants) than by the other London Water Companies, *Cates* 672, 673.

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New York. Admission as to the excellence of the mechanical arrangements in New York, and as to the rapidity in turning out to fires; the cost, however, being three times that in London, *Shaw* 4754-4756——Much larger proportion of false alarms in New York than in London, *ib.* 4757-4760.

Northumberland Avenue. Great height to which some of the buildings in Northumberland Avenue will probably reach; thickness of the walls adverted to, *Vulliamy* 3091, 3092. 3130, 3131 —— Arrangement, as made by the New River Company with the Metropolitan Board, for placing hydrants in Nothumberland Avenue; high pressure available, *Muir*, 3329. 3334-3338. 3436.

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O.

Opera Comique. Advantage of the underground exit from the Opera Comique, it being in addition to several other exits, *Fane* 1098-1100——Excellent exit from the pit of the Opera Comique, though the theatre is partly underground, *ib.* 1155-1159. 1170-1172——Improvement if two exits were always available for the dress circle and stalls, *ib.* 1376-1378.

Oxford Music-hall. Reference to the burning of the former Oxford Music-hall as the only instance of the kind in the metropolis within witness' recollection, *Pownall* 1897, 1898.

P.

Pantechnicon. Statement in explanation of the time at which witness arrived at the Pantechnicon fire, as well as of the services rendered by the salvage corps in the removal of carriages at an early stage of the fire, *Swanton* 970-977. 990-1003——Arrival of the brigade about half-an-hour after the volunteer engine at the Pantechnicon fire, *Hamlyn* 4179.

Paris. Steps being taken in Paris for laying down hydrants within reach of all the houses, *Chadwick* 35. 37.——*See* also *Theatres*, 24.

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Penrose, Francis Cranmer. (Analysis of his Evidence.)—Is surveyor to the fabric of St Paul's Cathedral; submits suggestions upon the subject of the construction of buildings with reference to security against fire, 597 *et seq.*——Conclusion that cast-iron construction cannot satisfactorily resist fires, 600——Description of a fire-resisting material, invented by Mr. Philip Brannon, consisting of cocoa-nut fibre and a cement of selenitic lime, prepared and indurated by a special process; illustration of the efficacy of this invention, which is known as "stone felt," 600, *et seq.*——Use of Mr. Brannon's stone felt for the protection of part of St. Paul's; moderate cost involved, 600. 608, 609. 635.

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Phipps, Charles John. (Analysis of his Evidence.)—Considerable experience of witness in the construction of theatres in the metropolis and in the provinces, 1587-1589——Opinion that the present inspection of the plans of new theatres, and of the building, before it is licensed, is of a very satisfactory character, 1590, 1591——Radical alteration necessary in order to bring old theatres under the conditions required in the case of new theatres, 1592-1596——Great importance attached to a solid brick wall, between the stage and the auditorium, carried through the proscenium to the roof; practibility of this in existing theatres, 1594-1598.

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Use of naked lights on the ground rows, and, occasionally, behind the wings; danger from this source, 1699, 1700. 1809–1815——Provision of at least three modes of egress from each theatre in London, 1701——Four separate doors into the street from the Vaudeville Theatre, 1701–1703——Lapse of about six or seven minutes in clearing the theatres, 1704, 1705——Opinion that an extended system of inspection would not take the responsibility off the managers, 1718, 1719. 1816–1819——Objection to inspection by the staff of the Metropolitan Board of Works, 1720, 1721. 1780–1792.

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POLICE:

1. *Evidence for and against an Amalgamation of the Fire Brigade with the Police.*
2. *Suggestions for utilising the Police Stations, Fixed Points, &c., in connection with Fires.*
3. *Question of Telegraphic Communication between the Fire Brigade and Police Stations.*
4. *Rewards to the Police in connection with Fires.*
5. *Conclusions and Recommendations of the Committee.*

1. *Evidence for and against an Amalgamation of the Fire Brigade with the Police:*

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Expediency

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POLICE—continued.

1. *Evidence for and against an Amalgamation*—continued.

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Contemplated special training of the men employed with the engines, whilst the police generally should be utilised in applying hydrants and hose, *Chadwick* 246–249——Gradual acquisition of the necessary experience by the police, if regularly employed in fire prevention, *ib.* 279.

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Frequency of additional policemen being required to keep order at fires, instead of their services being available for the work of fire extinction, *Hamlyn* 4697–4699.

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2. *Suggestions for utilising the Police Stations, Fixed Points, &c., in connection with Fires:*

Advantage if there were a supply of buckets and of small hand-engines at the several police stations, *Fraser* 346. 349–352. 388–391——Sufficient number of police stations in the City at which to keep appliances for the suppression of fires at the beginning, *ib.* 350–352——Usefulness of hose kept close to hydrants, so that the police on duty might at once take action, *ib.* 353–356——Supply of men at fires from the several police stations according to the demands made for them, *ib.* 359.

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4. *Rewards to the Police in connection with Fires:*

Advantage of a system of rewards to the police for prompt and successful action in extinguishing fires, *Chadwick* 19–22——Comment upon the former system in London whereby the police were paid for indirectly keeping fires in, *ib.* 19, 20.

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Summary of the duties of the police in connection with fires, *Rep.* xii——Cordial and harmonious character of the relations between the police and the brigade, *ib.*

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Dissent from Colonel Henderson and concurrence with Captain Harris upon the question of amalgamation with the police, *Rep.* xii, xiii——Much less cost to the ratepayers by an extended employment of the police, than by an extension of the brigade without further aid from the police, *ib.* xiii——Successful employment of the police in fire extinction at Liverpool, Manchester, and the royal dockyards, *ib.* xiv.

Expediency of the City authorities facilitating the action of the fire brigade within the City as a distinct branch of the metropolitan police, *Rep.* xiv.

Conclusion that an extension of the fire brigade can best be accomplished, both in respect of economy and efficiency, by the brigade being constituted a distinct branch of the police under an assistant commissioner appointed for that purpose, *Rep.* xiv.

Recommendation that the fire brigade should be transferred from the Metropolitan Board to the Commissioner of Police for the metropolis, so however as to constitute a distinct branch to be placed under the immediate command of a separate assistant commissioner, and to be authorised to act within the City of London as well as in the metropolis, *Rep.* xxviii.

Conclusion, also, that the police stations and the fixed points should be used as fire-brigade stations, or as places where small engines or other appliances should be deposited, and that all police constables, both of the metropolis and City, should be auxiliary to the fire brigade; but that, as now, each force should be empowered to act only within its own jurisdiction, except on a special requisition, *Rep.* xxviii.

See also *City of London*, 2. *Hydrants*, 8.

Pownall, John Fish. (Analysis of his Evidence.)—Considerable experience of witness, as one of the bench of Middlesex magistrates, in regard to the course pursued in connection with the licensing of music halls, 1820, 1821——Personal inspection as a rule by some of the magistrates before places are licensed for music and dancing; due notice given of the intention to apply for a license, 1822–1827——Opinion that there is no sufficient architectural inspection, and that each applicant should have a certificate of the structural fitness of the building, 1825–1830. 1856, 1857.

Very trifling inspection required in the great majority of cases in which music licenses are granted to public-houses; important distinction between these cases and those in which licenses are granted for music and dancing or other entertainment, 1831–1838——Opinion that there is no necessity for a Government inspection before the grant of music licenses, 1832, 1833——Effect of any general rules as to construction to shut up many places having these licenses, 1839–1841——Approval of the district surveyors in the metropolis, as the body by whom certificates as to construction should be given, an appeal being given to the Metropolitan Board, 1842–1844.

Consideration of the present rules and regulations as applied to music halls and theatres, respectively; very little value attached to fines and penalties as a means of enforcing the regulations, suspension or withdrawal of license being much more effectual, 1845–1850. 1871–1873——Explanation that the licensing of theatres does not come in any case before the Quarter Sessions, 1851, 1852——Circumstance of the magistrates having refused a music and dancing license to the Alhambra some years ago, whereas a license was afterwards granted by the Lord Chamberlain for a theatre, 1853–1855.

Particulars as to the magistrates having withdrawn the license from the Gaiety, before it was converted into a theatre, and as to the Lord Chamberlain having subsequently granted a license, after a division had been made between the theatre and the restaurant,

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1859–1862. 1865. 1879. 1894–1896——Prohibition of theatrical representations in music halls; great difficulty in drawing the line, 1863, 1864—— Probable cause of the refusal of license by the magistrates in the case of the Variety Theatre at Hoxton, 1865.

Large numbers of people held by some music-halls, whilst there are no special requirements by the magistrates as to the number of exits, 1866–1868——Question considered whether the magistrates should not require, for the protection of the public against fire, a certificate from an architect or district surveyor, before granting a license to any music-hall, 1874–1883——Extent to which the question of previous conviction is gone into by the magistrates when renewal of license is applied for; this rests very much with the police, 1884–1890.

Belief that no music-hall or other licensed place has been suppressed by the magistrates on the ground of inadequate protection against fire, 1891, 1892——Difficulty in laying down any rule as to the number of exits, it being impossible to foresee the effects of panics, 1893—— Reference to the burning of the former Oxford Music Hall, as the only instance of the kind in the metropolis within witness' recollection, 1897, 1898.

Pressure of Water. See *Water Supply.*

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R.

Rate. Annual increase since 1866 in the amount of the halfpenny rate for the Fire Brigade estimate of 48,148 *l.* in 1876, *Rep.* vi.

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Recruits. Statement in explanation of the preference given to men from the Merchant Service, as compared with men from the Royal Navy, in recruiting for the brigade; few good climbers now to be had from the Navy, *Shaw* 4762–4764.

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Richmond. Prevention of great waste of water at Richmond since the local authorities have undertaken the supply, *Chadwick* 38. 41.

River-side Property. Advantage of hydrants for the protection of valuable property by the river-side, *Haywood* 946, 947——Opinion favourable to flat-bottomed rafts with tugs for drawing engines close to river-side fires, *ib.* 948–954——Protection of river-side property by the floating engines, as well as in many cases by hydrants, *Greaves* 4005, 4006.

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THEATRES:

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Paper supplied by Mr. Hollingshead relative to the theatres licensed by the Lord Chamberlain; total of forty-five, there being also two patent theatres and six magistrates' theatres, *App.* 399.

2. *Inspection; amended Arrangements suggested:*

Annual inspection of theatres on the part of the Lord Chamberlain, most careful inquiry being made into the detailed arrangements for the safety of the public, *Fane* 1027. 1044–1046—Conclusion that some other department than that of the Lord Chamberlain should be entrusted with the inspection of theatres, music halls, &c., and should deal with all questions of construction, *ib.* 1047–1053—Circumstance of witness' inspection of theatres being carried out in the day-time; question hereon whether it should not be at a time when the gas is burning, the gas-lights being a fertile source of danger, *ib.* 1341–1346—Practice of giving notice to the managers before the annual inspection, *ib.* 1403–1405.

Witness,

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2. *Inspection; amended Arrangements suggested*—continued.

Witness, who is an architect, has for about five years been employed by the Lord Chamberlain in the annual inspection of theatres, *Robinson* 1406-1408. 1558—Improvements suggested at the annual inspection of old theatres, the managers usually carrying them out successfully, *ib.* 1411, 1412——Notice given of each inspection; obstacles to sudden inspection, or to any complete inspection at night during the performances, *ib.* 1455, 1456. 1539–1542——Instance of inspection in the evening without notice during the last pantomime season; breach of regulations discovered in half of a door having been fastened back, *ib.* 1457–1463.

Advantage if there were a much more frequent inspection of theatres, *Robinson* 1484, 1485. 1556, 1557——Advantage also of occasional inspection in the evening without notice, *ib.* 1522–1525. 1539–1542.

Suggestion that the inspection should be more frequent and should be carried out by perfectly impartial persons, not in private practice, appointed by Government and not by the Lord Chamberlain, *Phipps* 1599–1605. 1617–1624——Opinion that the proposed Government inspection should apply to all theatres and music halls throughout the country, *ib.* 1613–1616. 1712, 1713——Proposed inspection at least twice a year, *ib.* 1623, 1624. 1710, 1711——Obstacles to a satisfactory inspection of theatres by night, though occasional inspection at night without notice is desirable, *ib.* 1694–1698.

Opinion that an extended system of inspection would not take the responsibility off the managers, *Phipps* 1718, 1719. 1816–1819——Objection to inspection by the staff of the Metropolitan Board of Works, *ib.* 1720, 1721. 1780–1792.

Examination as to witness' grounds for objecting to the district surveyors in the metropolis as inspectors of theatres, and for preferring inspection in London and the provinces by three or four architects appointed specially and exclusively for the purpose, *Phipps* 1731–1756. 1761–1766. 1780–1807.

Advantage of inspection, without previous notice, by an officer of the fire brigade whilst the performances are going on, *Hare* 1924, 1925. 1953–1956. 1972, 1973——Efficiency of the supervision by the Lord Chamberlain's department, *Henderson* 2065–2067——Conclusion as to their being no necessity for inspection more than once a year, *ib.* 2114.

Notice always received by witness before the annual inspection, *Henderson* 2149–2151——Advantage of any inspection during the performance being made by a fireman, *ib.* 2152–2154——Approval of occasional inspection after the first licensing, in order to see that the regulations are complied with, *ib.* 2166–2169.

Approval of official inspection without previous notice and at any time, *Abrahams* 2240, 2241. 2326–2331——Relief to managers if aided by a surveyor's occasional inspection, *ib.* 2293–2295——Check, by means of the yearly inspection, after the original license has been granted, *ib.* 2332–2334——Doubt as to the managers objecting to pay the cost of inspection, *ib.* 2356, 2357——Thorough character of the inspection on the part of the Lord Chamberlain, *ib.* 2364–2366——Approval of a night inspection, *Hollingshead* 2519, 2520.

Advantage if there were a frequent inspection by witness' department; difficulty of inspection during the performances, *Marquis of Hertford* 2668, 2669. 2723—Large increase of staff and of expense necessary, if witness' department is to undertake a frequent inspection of theatres, *ib.* 2721–2725. 2752. 2755——Inspection of many theatres at night without previous notice, so far as the staff admits; want of increased inspection by day as well as by night, *ib.* 2752–2756——Decided advantage of inspection when unexpected, *ib.* 2820.

3. *Practice as to Licenses:*

Result of the inquiry into theatrical licenses and regulations before the Select Committee of 1866, and of the recommendations of the Committee that the Lord Chamberlain has since granted licenses somewhat more freely than before that year, *Fane* 1010–1013——Annual renewal of licenses to old theatres, but only on condition of the suggestions of the Lord Chamberlain being complied with as far as possible; the theatres are, in fact, safe under ordinary circumstances, *ib.* 1029–1037. 1043.

Grounds for concluding that it is more expedient to vest the licensing in the Lord Chamberlain than in the magistrates; reference especially to the case of the Variety Theatre, Hoxton, *Phipps* 1674–1685. 1714–1717. 1808——Opportunity of the public to be heard before the licensing magistrates, but not before the Lord Chamberlain, *ib.* 1767, 1768.

Explanation that the licensing of theatres does not come in any case before the quarter sessions, *Pownall* 1851, 1852——Expediency of direct responsibility in the licensing authority, *Hollingshead* 2418–2420.

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3. *Practice as to Licenses*—continued.

Jurisdiction of witness' department as to the annual renewal of licenses to theatres, *Marquis of Hertford* 2648, 2649——Contemplated licensing in the first instance of all new theatres throughout the country by the Lord Chamberlain, on certificate from a Government department; whilst their regulation subsequently should rest with the local authorities, *ib.* 2663, 2664——Opportunity of the public for being directly heard before licenses are granted by the magistrates, but not as regards licenses by witness, *ib.* 2734-2736——Conclusion as to managers having no appeal from witness' refusal to grant licenses, *ib.* 2742.

4. *Suggested Inquiry as to Construction, either through a Government Department or the Metropolitan Board of Works:*

Opinion that the Lord Chamberlain's license should not issue until he has been furnished with a certificate from some other public department on structural points, *Fane* 1047-1053. 1079-1083. 1111-1115——Power of the Lord Chamberlain to require structural alterations in a new theatre after it is built, and before it is licensed, *ib.* 1285-1287.

Approval of all theatres and music halls being placed under some authority who should certify as to their construction, *Hare* 1905, 1906. 1923——Approval of an official inspection of theatres and music halls as to construction, with power of enforcing regulations by means of penalties, *Henderson* 2056-2059——Concurrence in the suggestion that upon all questions of construction a certificate by the district surveyor should be necessary before issue of the Lord Chamberlain's license, *Abrahams* 2222-2227. 2358-2360. 2400.

Improvement if there were a responsible public department for the survey of theatres as regards construction, *Hollingshead* 2409, 2410——Opinion that the same department should be entrusted with the surveying and the licensing, as by enlarging and strengthening the Lord Chamberlain's office, *ib.* 2421-2423——Approval of an efficient survey and of increased inspection; relief thereby to managers, *ib.* 2472-2475.

Opinion that questions of construction as regards both old and new theatres should be dealt with by a Government department, and not by the Metropolitan Board through the district surveyors, *Marquis of Hertford* 2659-2662. 2737, 2738——Objection to the decisions of the Lord Chamberlain being subject to a Board not responsible to Parliament, *ib.* 2662—— Approval of inspection by persons conversant with the construction of theatres rather than by district surveyors, *ib.* 2785-2787. 2821.

Explanation with further reference to witness' objection to the Metropolitan Board as the body to grant certificates of construction, *Marquis of Hertford* 2802-2809. 2813, 2814.

Evidence in support of the conclusion that the Metropolitan Board is the proper authority to deal with the construction of theatres and other public buildings in the metropolis, and that the district surveyors should see that the rules of the Board are properly carried out, *Vulliamy* 3046-3059——Entire distinction between the proposed duties of the Board as to construction in the case of theatres, and the duties of the Lord Chamberlain as to licensing, *ib.* 3053-3056——Distinct duties to be discharged by the Board and its officers, and by the Lord Chamberlain, as regards theatres, *ib.* 3111, 3112. 3128, 3129——Sufficient time of district surveyors for seeing to the construction of theatres, &c.; their competency for the purpose, *ib.* 3118-3125.

Doubt as to theatres being subject to the provisions of the Metropolitan Building Act, *Shaw* 4859-4864——Conclusion that certain fixed rules as to construction, appliances, &c., should apply to all theatres, and that if such rules are not adopted no license should be granted, *ib.* 4921-4924.

5. *Rules and Regulations of the Lord Chamberlain in reference to Fires: Suggestions as to their Enforcement:*

Difficulty as regards regulations for providing against fires in theatres through there being no executive authority for enforcing such regulations, *Chadwick* 320.

Inability of the Lord Chamberlain to enforce regulations save by withdrawal of license, which he can only do in case of riot or misbehaviour, *Fane* 1204-1207. 1249, 1250——Regulations issued to managers by the Lord Chamberlain; these have been in force for many years, *ib.* 1299, 1300. 1318, 1319.

Want of staff in the Lord Chamberlain's office for seeing that the regulations are complied with; responsibility of the managers in the matter, *Fane* 1371-1373——Expediency of some simple machinery for enforcing the Lord Chamberlain's regulations and for imposing penalties, *ib.* 1399-1402.

Approval of enforcing the regulations by means of fines, *Robinson* 1439, 1440; *Phipps* 1625, 1626——Grounds for objecting to the frequent alterations required by the Lord Chamberlain's office, as after the occurrence of any great fire in a theatre, and before

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5. *Rules and Regulations of the Lord Chamberlain, &c.*—continued.

before such alterations are justified by experience, *Phipps* 1652–1658——Approval of theatres being shut up if the managers refuse to take the precautions laid down for safety, *ib.* 1757–1760.

Advantage if regulations were enforced by penalties, instead of by refusal of license, *Hare* 1907, 1908. 2005, 2006——Objection to withdrawal or suspension of license for non-compliance with regulations, a system of money penalties being sufficient, *Henderson* 2134–2148. 2158–2165.

Doubt as to the expediency of a system of police penalties for enforcing regulations, *Abrahams* 2228. 2231——Approval of the existing regulations of the Lord Chamberlain as efficacious for the prevention of fires, *ib.* 2237. 2385. 2389——Advantage of a modified power in the Lord Chamberlain for enforcing regulations, as by closing the theatre for a time instead of refusing the license, *ib.* 2337-2345. 2401-2403——Satisfaction of witness with the present rules of the Lord Chamberlain, although there is no appeal, *ib.* 2392-2395. 2399.

Expediency of the Lord Chamberlain having power to prosecute and punish for breach of regulations, without necessarily withholding the license, *Hollingshead*, 2452–2456—— Objection to temporary suspension of license, a system of penalties being preferable, *ib.* 2495-2503.

Issue, for the first time, two years ago, of printed regulations for the protection of theatres from fire, *Marquis of Hertford* 2650–2652——Absence of power in witness to enforce the regulations, save by non-renewal or temporary suspension of license; objection to so severe a penalty in all cases of breach of regulations, *ib.* 2653-2656—— Advantage in sometimes restricting the license to shorter periods than a year, *ib.* 2654. 2687. 2743——Approval of enforcing regulations by police penalties rather than by suspension of license, *ib.* 2657, 2658. 2745, 2746.

Circulars frequently sent to the managers calling their attention to the regulations, the latter being strictly enforced, *Marquis of Hertford* 2709-2713. 2717, 2718——Improvement if witness had power to withdraw the license at any time, *ib.* 2739-2741.

Endeavours of witness to enforce all recommendations from his office, *Marquis of Hertford* 2747, 2748—— Further approval of police fines, together with endorsement of license, for breach of regulations, *ib.* 2778–2782——Adoption of the Lord Chamberlain's regulations at theatres generally, as well as in London, *ib.* 2784.

Rules for theatres licensed by the Lord Chamberlain, dated February 1876, *App.* 395, 396——Official communication to each theatre in forwarding the rules of February 1876, *ib.* 400.

Circular from the Lord Chamberlain dated 21st December 1876, urging strict compliance with the rules and regulations, *App.* 400, 401.

Further suggestions submitted in letter from the department, dated 23rd May 1876, in connection with the Christmas holidays, *App.* 401.

6. *New and Old Theatres respectively:*

More strict requirements structurally in the case of new theatres than of old ones, *Fane* 1028——Jurisdiction exercised by the Lord Chamberlain over the site and over the plans of each new theatre, *ib.* 1275-1277.

Strict requirements as to staircases, exits, &c., before any new theatre is licensed by the Lord Chamberlain, *Robinson* 1409, 1410——Opinion that the present inspection of the plans of new theatres, and of the building before it is licensed, is of a very satisfactory character, *Phipps* 1590, 1591——Radical alteration necessary in order to bring old theatres under the conditions required in the case of new theatres, *ib.* 1592–1596 ——Approval of an appeal from the veto of an architect upon the opening of any theatre; improbability of any appeal if the rules and plans are laid down in the first instance, *ib.* 1786–1799.

Structural improvement, as far as possible in the old theatres, whilst the new theatres are excellently arranged, *Marquis of Hertford* 2695, 2696——Difficulty in making some of the older theatres safe against fire, save by rebuilding them, *Vulliamy* 3137–3139.

7. *Means of Exit: Doors, Passages, &c.:*

Provision of at least three separate entrances in the case of every theatre in London, *Fane* 1022——Provision in almost every case of two separate means of egress for each part of the auditorium, *ib.* 1023–1026——Constant improvements since 1866, as to means of egress, &c.; strict requirements in connection with the new theatres since that year, *ib.* 1086–1091.

Narrow passages in some of the older theatres, witness submitting, however, that every theatre has a separate exit for the boxes, the pit, the gallery, and the stalls, *Fane* 1092,

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7. *Means of Exit: Doors, Passages, &c.*—continued.

1093. 1148–1163. 1181——Very narrow character of some of the inter-communicating passages, there being, however, large direct passages generally available, *Fane* 1092, 1093. 1210——Great improvement, doubtless, if the passages of the older theatres were wider; the Lord Chamberlain could not, however, order their reconstruction, *ib.* 1198–1200. 1208–1210. 1260–1262.

Requirement of passages not less than four feet wide in the case of all new theatres, *Fane* 1208, 1209——Approach of full publicity being given as regards all the available means of exit; advantage of using them all every night, *ib.* 1214, 1215. 1263–1267. 1374–1378——Steps taken in order to secure the doors opening freely from the inside, *ib.* 1216–1219. 1222. 1242, 1243——Doubt as to the advantage of a large central gangway down the middle of a theatre, as in the Alhambra, *ib.* 1240, 1241. 1272. 1364.

Examination upon the questions of all doors and barriers really opening outwards, as provided by regulation; probability of this having been overlooked in one or two cases, *Fane* 1320–1340.

Expediency of the passages or exits being not less than four feet wide; suggestions on this point, *Robinson* 1414–1422——Stipulation as to all doors and barriers opening outwards; conditional approval of barriers in passages four feet wide, *ib.* 1423–1428——Conclusion that all the means of egress and all the doors should be open every night so that they may be properly known to the public, *ib.* 1429–1438.

Amendment proposed in the regulation as to passages, staircases, &c.; increased width proposed for passages according to the number of people, *Robinson* 1464–1469——Facility in arranging for all doors opening outwards, *ib.* 1510, 1511.

Importance of a direct exit from each part of the auditorium, *Phipps* 1663–1665——Objection to any passages being less than four feet in width, whilst the width should always increase outwards, *ib.* 1666–1668——Provision of at least three modes of egress from each theatre in London, *ib.* 1701.

Advantage if the exits from theatres opened into different streets, as in the case of Drury-lane, *Hare* 1980–1989——Advantage of two or more distinct street exits from every theatre, *Abrahams* 2346–2349——Value of ample exits as greatly obviating the effects of panics, *ib.* 2363.

Importance chiefly of sufficient passages and exits, in the event of fire, *Hollingshead* 2425——Probable advantage if the public were accustomed to the use of all the doors, *ib.* 2435–2437——Advantage generally of separate exits into the street for the different parts of the audience, *ib.* 2449, 2450——Advantage also in the passages increasing in width towards the exit, *ib.* 2451——Advantage also in every theatre having exits on at least two different sides, *ib.* 2511.

Instance of a swing door having been found fastened back; satisfactory reason assigned by the manager, *Marquis of Hertford* 2671–2673——Difficulty in always enforcing improved exits, *ib.* 2818, 2819.

Advantage of separating the different parts of the auditorium, each having a separate entrance and exit, with a second exit also for each portion of the audience, *Shaw* 4865–4867——Suggestions with a view to the passages leading from the auditorium of the theatre containing a certain portion of the audience, and being so far heat-proof as to allow sufficient time for exit, *ib.* 4867–4875. 4888–4893——Improvement by making the passages zigzag, so as to mitigate pressure, *ib.* 4892, 4893——Approval of the number of exits being in proportion to the number of persons the theatre may contain, *ib.* 4894–4896.

8. *Time occupied in Clearing the Theatres:*

Statement that all the theatres in London under the jurisdiction of the Lord Chamberlain are so far safe in case of fire that under ordinary circumstances the audience can leave them in six or seven minutes, *Fane* 1014–1017. 1258, 1259——Necessity of the audience being out of a theatre on fire before the arrival of fire engines, *ib.* 1315–1317.

Means of emptying all the theatres in from five to seven minutes, *Robinson* 1413——Lapse of about six or seven minutes in clearing the theatres, *Phipps* 1704, 1705.

Varying time required to clear different theatres in London of their audiences; belief that in no case would three minutes suffice, *Shaw* 4958–4963.

9. *Placing of Chairs in Gangways or Passages:*

Suggestion that the placing of chairs in gangways be treated as a police offence; blame attaching to the public rather than to the managers on this score, *Fane* 1054–1058——Approval of managers being advised by the Lord Chamberlain not to allow chairs

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9. *Placing of Chairs in Gangways or Passages*—continued.

chairs being placed in gangways, *Fane* 1201-1203——Further approval of the placing of chairs in gangways being treated as a police offence, *ib.* 1361-1366, 1389-1394.

Danger in vacant spaces and passages being occupied by chairs; recent prohibition of this practice, *Phipps* 1769-1772——Expediency of a prohibition upon the use of chairs in gangways, *Hare* 1963, 1964. 1975, 1976——Disapproval of the use of chairs in gangways; limited use of chairs at the Criterion, *Henderson* 2124-2127.

Exceptions taken to the conclusion that the use of chairs is necessarily an aggravation of danger in case of panic; witness, however, has no chairs in passages, *Abrahams* 2229-2232. 2261-2269. 2322-2325. 2378——Disapproval of chairs in passages as increasing the danger in case of panic; check to any sudden rush by means of a barrier, *Hollingshead* 2521, 2522.

Evidence in support of the conclusion that the placing of chairs in gangways of theatres, &c., is not really important as increasing the danger in case of fire or panic, but that any penalties should fall on the public, who cannot now be prevented from removing chairs to such places, as well as on the managers, *Villiers* 2591-2613, 2632-2647.

Letter from the Lord Chamberlain in September 1875, directing that no seats or obstructions are to be placed in the gangways or passages intended for the exit of the audience, *App.* 400.

10. *Advantage of a Solid Wall between the Stage and the Auditorium:*

Importance of a solid proscenium wall over the top of the theatre; difficulty on this point in old theatres, *Fane* 1071-1074 —— Improvement if, in all theatres, a wall dividing the stage from the auditorium were carried two feet above the roof, *Robinson* 1489-1493. 1528.

Great importance attached to a solid brick wall between the stage and the auditorium, carried through the proscenium to the roof; practicability of this in existing theatres, *Phipps* 1594-1598——Suggestion that the auditorium, stage, and other parts of the theatre be kept as far as possible distinct by means of fire-proof separations, *ib.* 1641-1646——Circumstance of witness having built some theatres without a wall between the stage and auditorium extending above the roof; that is, on the score of economy, *ib.* 1687-1693.

Importance of some means of solid separation between the auditorium and the stage and dressing-rooms, *Shaw* 4858. 4897, 4898.

11. *Question as to the Use of a Wire or Iron Curtain:*

Doubt as to the advantage of a wire or iron curtain for shutting off the stage from the audience in case of fire, *Fane* 1065-1070. 1236——Proposed use of a wire curtain in every theatre; this is insisted upon in Paris, *Robinson* 1494-1497. 1526, 1527——Grounds for objecting to an iron curtain in front of the stage, *Henderson* 2022-2024. 2106-2109. 2156, 2157 —— Doubtful value of a wire-gauze curtain, as in French theatres, *Hollingshead* 2463-2469.

Suggestion that in addition to other precautions, as between the stage and the auditorium, there be a fire-proof curtain ready to be lowered across the stage on the first appearance of fire, *Shaw* 4898-4908. 4912, 4913.

12. *Chemical Process for rendering Dresses and Scenery Incombustible:*

Approval of a certain soda process for rendering dresses, &c. incombustible, though hardly required for scenery, *Hare* 1959. 1974——Use by witness of tungsgate of soda for rendering scenery incombustible; difficulty in the case of wood and of dresses, *Henderson* 2033-2038. 2115-2117——Slight value attached to processes for making scenery incombustible; approval, however, of this precaution, and more especially for dresses, *Abrahams* 2215-2217. 2245-2248——Failure of some experiments with tungsgate of soda, as applied to scenery and dresses, *Hollingshead* 2515.

13. *Naked Lights:*

Suggestion with a view to preventing danger from the gas-lights, *Robinson* 1474-1479 ——Use of naked lights on the ground rows, and occasionally behind the wings; danger from this source, *Phipps* 1699, 1700. 1809-1815——Inconvenience if the lights between the wings must be protected by wire gauze; doubt, moreover, as to this being necessary, *Abrahams* 2209, 2210. 2252-2257.

Several orders issued against the use of naked lights; means of enforcing this prohibition, *Marquis of Hertford* 2757-2762. 2790, 2791.

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14. *Water Supply, Hydrants, &c.:*

Careful inquiry on the part of the Lord Chamberlain in regard to the provision of hydrants or other means for promptly applying water, *Fane* 1231-1235. 1254-1256——Improvement as regards water supply, many of the theatres being now connected with high-pressure mains, and being provided with hydrants and with hose and other appliances in readiness, *Robinson* 1442-1449——Importance of the hose for application to hydrants being always ready for instant use, *ib.* 1513-1521——Few theatres in London in which there are firemen employed to attend to the hydrants, &c., *ib.* 1550-1555——Importance of hydrants in all theatres, cisterns on the roof being useless; difficulty as to the former, unless there is a high-pressure main available, *ib.* 1564-1573.

Inquiry by the inspector into the water supply and the use of hydrants, *Marquis of Hertford* 2763-2765.

Readiness of the Kent Company to supply water by meter for hydrants in theatres, &c.; belief that there is no hydrant in the Greenwich theatre, *Dickson* 4461-4465.

Expediency of the water supply being provided in all theatres on some fixed plan, and of hydrants, with constant pressure, being adopted, *Shaw* 4916, 4917——Want not only of structural improvements in theatres, but of arrangements for the immediate extinction of any fire that may occur, *ib.* 5043.

15. *Action of the Managers in the Adoption of Precautions; Expediency of their continued Responsibility in the Matter:*

Anxiety shown by the managers to carry out the required improvements, *Fane* 1038. 1250——Doubt as to the expediency of relieving managers of theatres from responsibility, as would be the result of placing the buildings in charge of the fire brigade, *ib.* 1059-1064——Responsibility of the manager of each theatre to the Lord Chamberlain, there being several sub-heads under the manager, *ib.* 1292-1298——Great importance of not interfering with the responsibility of the manager, *ib.* 1383-1385.

Anxiety of managers to adopt any suggestions made by the Lord Chamberlain or the magistrates, *Hare* 1921, 1922. 1926——Great responsibility upon managers, even though the official inspection were much more frequent, *Abrahams* 2388-2391. 2396-2398——Satisfactory relations between the managers and the Lord Chamberlain, *Hollingshead* 2513.

Approval of full responsibility in the managers, *Marquis of Hertford* 2659——Satisfactory results shown upon the occasion of the general inspection instituted by witness after the Brooklyn fire; pains taken by the managers, as a body, to carry out the regulations, *ib.* 2670. 2673, 2674——Responsibility of managers, even though charged with the cost of inspection, *ib.* 2783.

Approval of the responsibility and the employment of firemen in theatres still resting with the managers of the theatres rather than with the fire brigade, *Shaw* 4918-4920. 4971-4975.

16. *Staff of Attendants: Suggestions hereon:*

Suggested employment of old soldiers or commissionaires as a means of securing order and confidence in case of panic, *Henderson* 2060-2064. 2069-2074. 2111——Importance of the doorkeepers and others being at their posts and keeping back any rush as much as possible, *Abrahams* 2232. 2322——Approval of the attendants being in uniform, in order that the public might know from whom they should take directions, *ib.* 2310, 2311.

Further statement as to the importance of well-trained attendants to see to the doors, &c., in case of panic; illustration in witness' theatres, *Abrahams* 2379-2387——Advantage in trusting the manager of any theatre and his men, rather than in requiring the presence of men from the fire brigade, *Hollingshead* 2460-2462. 2469. 2514.

Recommendations issued with a view to an improved organisation for the suppression of fires; doubt as to these being properly acted upon, *Marquis of Hertford* 2766-2773.

17. *Underground Theatres:*

Absence of disadvantage in theatres being underground, or partly so; that is, under certain conditions, *Fane* 1129-1138. 1148-1176. 1188——Less danger from pressure in hurrying from a theatre when underground, *ib.* 1387, 1388——Equal safety of an underground theatre as of one above ground, *Phipps* 1773, 1774.

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18. *East End Theatres:*

Impression as to the east-end theatres being more safely constructed and protected than the west-end theatres, *Abrahams* 2285–2287——Belief that the managers of the theatres generally in the east of London do their best to carry out the Lord Chamberlain's regulations, *ib.* 2321.

19. *Insurance Rates:*

Very high insurance rate in the case of some theatres, *Chadwick* 108. 152, 153——Lower rate of insurance where there is a division wall between the proscenium and the auditorium, *ib.* 1728, 1729——Facility in insuring witness' theatres; belief that the London theatres generally are insured, *Abrahams* 2367–2376.

20. *Danger from Panic rather than from Fire; rare Instances of Loss of Life through Fire:*

Conclusion as to danger really arising from panic and not from fire; this equally applies to all buildings where many people are assembled, *Fane* 1018–1021——Belief that nobody has been burnt in a theatre in London within the last fifty years; many lives have, however, been lost from panic and pressure, *ib.* 1190. 1257. 1273, 1274. 1397, 1398——Instances of great loss of life from the pressure caused by panic, *ib.* 1195–1197——Increased danger from panic in the case of large theatres, *ib.* 1239.

Security required against panic and not against fire, *Henderson* 2024. 2060——Statement as to fire never occurring during the performances in theatres, *ib.* 2024. 2060——Opportunity of the press for allaying panic, whereas since the Brooklyn fire the press has greatly aggravated this danger, *ib.* 2112, 2113.

Panic likely to be caused by the use of fire-plugs immediately in front of theatres, in the event of any fire close by; instance at the East London Theatre, *Abrahams* 2241–2244. 2350–2354——Danger generally owing to panic rather than to fire, *ib.* 2361, 2362——Single instance in the last thirty years of fire in any English theatre during the performance; exceptional instance also of loss of life, *Hollingshead* 2469–2471.

Exceedingly few fires at theatres in England; exceptional instance of loss of life owing to panic, *Marquis of Hertford* 2714——Anxiety of witness since the Brooklyn fire to guard against the effect of panics, *ib.* 2788.

21. *Suggestion that all Fires, however small, be Officially reported:*

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22. *Question as to Staircases and Pillars being of Wood, or Stone and Iron:*

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Explanation as to witness having prescribed iron girders for staircases after the Brooklyn fire; doubt whether these are so safe as wooden girders, *Marquis of Hertford* 2666, 2667.

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23. *Suggestions on the Part of the Society of Arts:*

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24. *France:*

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25. *Other Details and Suggestions on various Points:*

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26. *Conclusions and Recommendations of the Committee:*

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Dissent

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W.

WATER SUPPLY:

1. *Duties of the Companies as to the Supply at Fires, and for Domestic Purposes.*
2. *Advantages of Constant, as compared with Intermittent Supply; Saving of Waste under Constant Supply.*
3. *Action, respectively, of the Water Companies, and of the Metropolitan Board in reference to Constant Supply.*
4. *Conversion from the Intermittent to the Constant System; Cost involved.*
5. *Pressure.*
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7. *Supply in Wapping and Shadwell.*
8. *Sources of Supply.*
9. *Great Cost of a Separate System of Mains, with Hydrants, for Fire Extinction exclusively.*
10. *Suggestions for the Purchase of the Water Companies by a Public Authority.*
11. *Advantage of Unity of Management; Suggestions as to the responsible Authority.*
12. *Exceptions taken to Amalgamation, or to Transfer to a Municipality or Water Trust.*
13. *Conclusions and Recommendations of the Committee; Special Importance attached to Constant Supply, and to the Purchase of the Companies by the Municipal Authority.*

1. *Duties of the Companies as to the Supply at Fires, and for Domestic Purposes:*

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6. *Requirements of Captain Shaw; Exceptions taken thereto:*

Exceptions taken to the requirements of Capt. Shaw as to the quantity of water available at fires; concurrence with Mr. Bramwell as to the excessive supply asked for, *Muir* 3359-3373. 3380. 3455——Impracticability of a supply of 2,100 gallons a minute, as suggested by Capt. Shaw to be available at any fire, *Greaves* 3802-3804. 3829-3831——Undue requirement of Capt. Shaw in asking for a pressure of 300 feet, *ib.* 3807, 3808.

Enlarged mains necessary in parts of the Kent Company's district, in order to give a supply of 2,000 gallons a minute at fires; conclusion that the cost should be borne by the Metropolitan Board, *Dickson* 4406-4415——Conclusion as to a supply of 2,000 gallons a minute not being really required in a large portion of the Kent Company's district, *ib.* 4412. 4416, 4417. 4437, 4438——Very large quantity of water represented by Capt. Shaw's demand of 2,000 gallons per minute; means of meeting this demand in most of the Kent Company's district, *Hack* 4560, 4561.

Evidence in support of the conclusion that there is nothing unreasonable or impracticable in witness' requirement of a supply of 2,000 gallons of water a minute; numerous instances of fires at which very large supplies have been obtained, chiefly from service-pipes, *Shaw* 4785-4795. 4800.

7. *Supply in Wapping and Shadwell:*

Evidence in reply to certain statements by Mr. Bazalgette as to the inadequacy of the pipes in parts of Shadwell and Wapping for the supply of the quantity of water required at large fires in the district; separate provision made by many of the warehouses for their own protection by means of hydrants, *Greaves* 3973-3987.

8. *Sources of Supply:*

Belief that an ample supply of water from spring sources may easily be got in substitution for the river supply, *Chadwick* 85——Prospect of the water when struck by the boring at Meux's Brewery, rising to the surface, *Muir* 3402-3404. 3413——Attempt being made by witness' company (as first proposed by him in 1866) to sink a well in Hertfordshire down to the lower green sand; progress made with this work, and prospect of its success, *ib.* 3403-3408. 3414. 3507-3513.

Probability of the supply from wells sunk into the lower green sand being unreliable, if several wells are sunk, *Muir* 3411, 3412——Outlay of about 10,000*l.* already incurred by

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Report, 1877—*continued.*

WATER SUPPLY—continued.

8. *Sources of Supply*—continued.

by witness' company in sinking the well in Hertfordshire; difficulty in estimating the total cost, *Muir* 3466, 3467——Increased supply expected to be obtained from the chalk in connection with the Hertfordshire well, *ib.* 3507, 3508. 3511——Sinking already carried through the chalk and the marl, the upper greensand having been reached, *ib.* 3509-3513.

Supply obtained by the Chelsea, Lambeth, and other companies from the Thames, exclusively, the East London Company also taking part of its supply from the Thames, *Few* 4691-4694.

9. *Great Cost of a Separate System of Mains, with Hydrants, for Fire Extinction exclusively:*

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10. *Suggestions for the Purchase of the Water Companies by a Public Authority:*

Conclusion as to the expediency of a purchase of the companies by a public authority; suggestions as to the terms of purchase, *Chadwick* 68, 69——Means of effecting the purchase without raising money for the purpose, *ib.* 69. 265, 266——The existing dividends might be secured either in Government Stock or upon the rates, *ib* 69.

Further consideration of the terms upon which the water companies might be purchased, *Chadwick* 265-270.

Belief that for a maximum sum of 18,000,000 *l.* all the water companies could be bought up, and that their purchase would be a very profitable investment to the metropolis, *Shuter* 582-587.

11. *Advantage of Unity of Management; Suggestions as to the responsible Authority:*

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Grounds for objecting to the Metropolitan Board of Works as the body to take charge of the water supply, *Chadwick* 70-73——Proposal that the supply be placed under a water trust, *ib.* 74-76.

Further statement as to the much better facilities of a public body than of a private company for examining the fittings in houses, for carrying out alterations and repairs, and for detecting and preventing waste; instance at Manchester, *Chadwick* 77-84——Reasons for not proposing to vest the water supply in a representative body, *ib.* 87——Proposed appointment of the water trust by the Home Secretary, *ib.* 88, 89——Belief that the proposed trust would acquire and administer the water supply much more efficiently and economically than the Metropolitan Board would do, *ib.* 91, 92.

Examination with further reference to witness' view that the water supply should be taken out of the hands of the companies, but that the Metropolitan Board are not a fit body to be entrusted with the management of the supply, *Chadwick* 206-222——Effect of an amalgamation of the companies in increasing the efficiency of the fire brigade, *ib.* 271——Neglect on the part of the companies to their own injury in not taking effectual steps for preventing the enormous waste through defective fittings; very different result expected if the supply were under a public authority, *ib.* 272, 273. 309-313. 319.

Non-objection to the water supply being transferred to the Metropolitan Board after it has been for some time under a special body or water trust, *Chadwick* 281——Approval of the control of the water supply being under the Metropolitan Board if still entrusted with charge of the fire brigade, *ib.* 305-308.

Conclusion of the Gas and Water Committee of the Corporation that the water supply of the metropolis should not be in the hands of private companies, but should be under some public authority, *Shuter* 576-581. 588——Advantage as regards pressure by an amalgamation of the companies under one authority, *ib.* 588-590.

12. *Exceptions taken to Amalgamation, or to Transfer to a Municipality or Water Trust:*

Belief that no important improvement could be made in the system of supply if the matter rested with the municipality; that is, unless at great expense, *Greaves* 3099-

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Report, 1877—*continued.*

WATER SUPPLY—continued.

12. *Exceptions taken to Amalgamation, or to Transfer, &c.*—continued.

3611——Grounds for the conclusion that there would be no great advantage in an amalgamation of the London water companies, *Greaves* 3782–3787. 3836——Result of witness' experience that an amalgamation of the pressures of the different companies is inexpedient, *ib.* 3788, 3789.

Evidence in further support of the conclusion that an amalgamation of the water companies under a public trust would not be attended with any important economy, *Greaves* 3955, 3956. 3960–3962——Doubt as to an amalgamation of the companies necessitating the laying down of new mains or the reconstruction of existing mains, *ib.* 3957–3959——Belief that the cost of engineering would be quite as much under amalgamation, *ib.* 3960, 3961.

13. *Conclusions and Recommendations of the Committee; Special Importance attached to Constant Supply, and to the Purchase of the Companies by the Municipal Authority:*

Obligation upon the several companies to supply water gratuitously at fires, but not to provide water sufficient for fire extinction, *Rep.* xiv——Regulation of supply with reference to domestic and manufacturing requirements and not with reference to fires, *ib,* xv.

Special importance of constant supply for the purposes of fire extinction, *Rep.* xv——Absence of any statutory obligation upon the companies to give a constant supply though they can be required to do so either by the Metropolitan Board or by the Local Government Board, *ib.*—— Limited extent to which constant supply is now available in reference to fires, *ib.*

Inadequacy of the existing pressure in the metropolis as regards the suppression of fires, the pressure having reference solely to domestic supply, *Rep.* xv——Insufficient size of the pipes in many districts in reference to fires, *ib.*

Great defects of the fire-plug system and of the necessary arrival of the turncock and fireman before water can be drawn and applied, *Rep.* xvi, xvii——Occurrence of only four cases in 1875, in which short supply of water was made the subject of a formal report by the brigade, *ib.* xvii.

Abundant evidence of the prejudicial effects resulting from want of concert between the Metropolitan Board and the companies, and from the several companies being independent of each other, under no statutory obligation to co-operate in the extinction of fire, and scarcely justified by their constitution in incurring expenditure for that purpose, *Rep.* xvii——Conclusion that generally the companies cannot be charged with any failure of duty, *ib.*

Statement as to the companies already acquitting themselves of their statutory duties with respect to pressure and pipage, *Rep.* xxii——Inconvenience from the want of concert between the Metropolitan Board and the companies, and from the several companies being independent of each other, *ib.*——More speedy suppression of fires if the supply were constant instead of intermittent, and if the pipes were larger and the pressure higher, *ib.*——Large outlay necessary in order to make the system of each company self-sufficient in reference to hydrants, *ib.*

Conclusion as to the importance of constant supply, increase of pressure, and enlargement of pipage, in connection with an extended system of hydrants, *Rep.* xxii——Improbability of the companies generally volunteering to give a constant supply, *ib.*——Nor is it likely that either the Metropolitan Board or the Local Government Board will exercise the powers they possess, under the Act of 1871, to make requisition on the companies, *ib.*——The Committee consider that the companies cannot be called upon to undertake the expense in question, *ib.*

Conclusion as to the expediency of a consolidation of the water supply in the hands of a single authority, conducting the business, not for immediate profit, but for public convenience, *Rep.* xxii——General result of a concentration of management to secure an effective means of extinguishing fires, *ib.* xxiii——Much less difficulty and expense in carrying out the several changes required in the system of water supply if unity of control and consolidation of public interests were allowed to supersede the separate action of the various companies, *ib.*

Recommendation by the Committee that the water systems now belonging to the various companies should be consolidated in the hands of a public authority, which, in dealing with the questions of constant supply, pressure, and pipage, should be bound to have regard, not only to the convenience of consumers, but also to the requirements for the extinction of fires, *Rep.* xxix.

See also *Chelsea Waterworks Company. City of London,* 5. *East London Waterworks Company. Fire-plugs. Glasgow. Grand Junction Waterworks Company. Hydrants. Kent Waterworks Company. Lambeth Waterworks Company. New River Company. Southwark and Vauxhall Waterworks Company. Turncocks. West Middlesex Waterworks Company. Watling*

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Report, 1877—*continued.*

Watling Street Station. See *Central Station.*

WEST MIDDLESEX WATERWORKS COMPANY:

Particulars relative to the height of each reservoir of the company, the highest being at an altitude of 323 feet, *Hack* 4480, 4481——Means of giving to the lower districts the pressure supplied by the highest reservoir; danger, however, to the domestic service-pipes thereby, *ib.* 4481-4483——Supply of the reservoirs by pumping-engines; facility of maintaining the supply and the pressure in the event of a large demand for fires, *ib.* 4484-4489.

Statement of the capacity of each of the three service reservoirs, the total being nearly 11,000,000 gallons, *Hack* 4490, 4491——Maximum delivery of 10,000 gallons a minute; considerable reserve available, especially at night, *ib.* 4492-4494——Particulars relative to several fires in the company's district since 1873 which have been extinguished by the application of stand-pipes, with hose attached, without any aid from engines; good pressure at many of these fires, *ib.* 4495-4512.

Total of eighty-five miles of constantly-charged mains in the company's metropolitan district, the pressure varying from fifty to 150 feet by day, with an improved pressure at night; inaccuracy of a statement by Sir Joseph Bazalgette as to the pressure given, *Hack* 4513. 4516-4521——Calculation that in the seventy miles of streets under constant supply in the metropolitan district of the West Middlesex Company 1,232 hydrants might be advantageously placed; that is, 100 yards apart, *ib.* 4522, 4523. 4529, 4530——Total of 122 miles of constantly-supplied mains in the entire district of the company, for which 2,147 hydrants would be required, *ib.* 4536-4539.

Connection between the several mains of the company, so that a very large volume of water is available for use by means of hydrants, *Hack* 4578——Fair distribution of the constant-supply mains over the company's district, *ib.* 4581, 4582——Connection between the company's mains and those of the New River and Grand Junction Companies, *ib.* 4583.

Further statement that in the entire district of the West Middlesex Company there are 122 miles of mains, of which seventy miles are within the metropolitan area, *Hack* 4585, 4586——Statutory obligation of the company as to pressure; conclusion as to the Act being fully complied with, *ib.* 4590. 4598-4600——Dependence entirely upon the reservoirs maintained by pumping power for supply and pressure, *ib.* 4591, 4592.

Particulars relative to the pressure at various points of observation, and the height to which the water may be presumed to rise, *App.* 410——Readings of pressure-guage taken during the day and during the night in June 1876, *ib.* 411.

Woolwich, Deptford, and Greenwich. Provision of some hydrants in the parishes of Woolwich and Greenwich, at the request and at the expense of the parish authorities, *Dickson* 4026-4030——Special arrangements carried out by the Kent Company for the protection of the Government property at Woolwich, Deptford, and Greenwich; separate fire mains laid down, with hydrants attached, the water being supplied from reservoirs in Greenwich Park and Woolwich Common, *ib.* 4228-4234. 4240-4242.

Suppression of many fires in the Woolwich district, and at Greenwich and Deptford, by the application of water direct from the pipes, either by hydrants or stand-pipes, and without the use of engines, *Dickson* 4243-4248——Conclusion as to the efficiency of the arrangements for the protection of Government property at Woolwich, Deptford, and Greenwich; considerable height to which water can be thrown, *ib.* 4445-4450——Check upon the company as regards the head of water maintained for Government purposes at the reservoirs at Woolwich and Greenwich Park, *ib.* 4456-4460.

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INDEX

TO THE

REPORT

FROM THE

SELECT COMMITTEE

ON

METROPOLITAN FIRE BRIGADE.

Ordered, by The House of Commons, *to be Printed*,
17 *July* 1877.

[*Price* 10 *d.*]

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Under 8 *oz.*

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REPORT

FROM THE

SELECT COMMITTEE

ON THE

NEW FOREST BILL;

WITH THE

PROCEEDINGS OF THE COMMITTEE.

Ordered, by The House of Commons, *to be Printed,*
22 *June* 1877.

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Thursday, 17th May 1877.

Ordered, THAT the NEW FOREST BILL be read a second time, and committed to a Select Committee.

Thursday, 7th June 1877.

Ordered, THAT the Select Committee on the New Forest Bill do consist of Six Members to be nominated by the House, and Five to be nominated by the Committee of Selection.

Committee nominated of—

Mr. William Henry Smith.	Lord Edmond Fitzmaurice.
Sir William Vernon Harcourt.	Sir Henry Wolff.
Mr. Rodwell.	Mr. Cowper Temple.

Members nominated by the Committee of Selection—

Colonel Loyd Lindsay.	Mr. Trevelyan.
Mr. Hanbury.	General Shute.
Mr. Brassey (Hastings).	

Ordered, THAT the Committee have power to send for Persons, Papers, and Records.

Ordered, THAT Three be the Quorum of the Committee.

Ordered, THAT all Petitions presented against the Bill be referred to the Select Committee on the Bill, provided such Petitions are presented three clear days before the meeting of the Committee; and that such of the Petitioners as pray to be heard, by themselves, their Counsel or Agents, be heard upon their Petitions, if they think fit, and Counsel heard in favour of the Bill against the said Petitions.

Monday, 18th June 1877.

Ordered, THAT the Petition of Samuel Wood and others, against alterations in the Bill be referred to the Committee.

Ordered, THAT the Report and Evidence of the Select Committee on the New Forest in 1875 be referred to the Committee.

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REPORT.

THE SELECT COMMITTEE to whom the **NEW FOREST BILL** was referred, have examined the allegations of the Bill, and found the same to be true, and have gone through the Bill, and made Amendments thereunto.

22 *June* 1877.

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PROCEEDINGS OF THE COMMITTEE.

Monday, 18*th June* 1877.

MEMBERS PRESENT:

Mr William Henry Smith.	Colonel Loyd Lindsay.
Mr. Rodwell.	Mr. Trevelyan.
Lord Edmond Fitzmaurice.	Mr. Hanbury.
Mr. Cowper-Temple.	

Mr. WILLIAM HENRY SMITH was called to the Chair.

The Committee deliberated.

[Adjourned till Wednesday next, at Twelve o'clock.

Wednesday, 20*th June* 1877.

MEMBERS PRESENT:

Mr. WILLIAM HENRY SMITH in the Chair.

Mr. Rodwell.	Sir Henry Wolff.
Lord Edmond Fitzmaurice.	General Shute.
Colonel Loyd Lindsay.	Sir William Vernon Harcourt.
Mr. Hanbury.	Mr. Brassey (Hastings).
Mr. Cowper-Temple.	Mr. Trevelyan.

Mr. Wyatt appeared as Agent for the Bill.

Preamble *postponed.*

Clauses 1—3, *agreed to.*

Clause 4, amended, and *agreed to.*

Clause 5.—An Amendment made.—Amendment proposed, at the end of the Clause, to add the words "Except so much as shall be allotted and set out by the Commissioners hereinafter appointed, who shall have a due regard to the preservation of the picturesque character of the Forest, and the protection of the interests of the commoners, provided always that the quantity of lands so to be allotted and set out shall not in all exceed 14,500 acres"—(Lord *Edmond Fitzmaurice*).—Question put, "That those words be there added."—The Committee divided:

Aye, 1.	Noes, 8.
Lord Edmond Fitzmaurice.	Sir William Vernon Harcourt.
	Mr. Rodwell.
	Sir Henry Wolff.
	Mr. Cowper-Temple.
	Colonel Loyd Lindsay.
	Mr. Hanbury.
	Mr. Trevelyan.
	General Shute.

Clause, as amended, *agreed to.*

Clauses 6—8, *postponed.*

Clauses 9—12, amended, and *agreed to.*

Clause 13, *agreed to.*

Clause 14, amended, and *agreed to.*

Clauses 15—21, *agreed to.*

Clause 22, amended, and *agreed to.*

Clause

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Clause 23, *agreed to.*

Clause 24, amended, and *agreed to.*

Clauses 25—32, *agreed to.*

Clause 33, amended, and *agreed to.*

Clauses 34—36, *agreed to.*

Clause 37, amended, and *agreed to.*

Clause 38, *agreed to.*

The following Paper was laid before the Committee by the *Chairman.*

NEW FOREST.

AREA of LAND occupied with PLANTATIONS.

	A.	R.	P.	A.	R.	P.
Quantity inclosed under Acts of 1698 and 1808, and remaining inclosed - -				5,999	3	2
Add Quantity inclosed, but subsequently thrown open - -	8,509	3	17			
Deduct area of inclosures thrown open, which were included in subsequent inclosures - - - - -	1,851	3	35			
				6,657	3	22
Area occupied under Acts of 1698 and 1808 - - -				12,657	2	24
Quantity inclosed under Act of 1851, and remaining inclosed -	5,036	1	16			
Deduct area of inclosure thrown open under Acts of 1698 and 1808, which has been included in inclosure under Act of 1851 (estimated) - - - - - - -	162	0	0			
				4,874	1	16
TOTAL Area occupied with Plantations - - -				17,532	0	0

The area occupied with timber not planted under the Acts of 1698, 1808, or 1851, is estimated roughly at 5,000 acres, but to this, Sections 5 and 6 of the New Forest Bill (1877) do not apply.

20 June 1877. *James K. Howard.*

[Adjourned till Friday next, at One o'clock.

Friday, 22nd June 1877.

MEMBERS PRESENT:

Mr. WILLIAM HENRY SMITH in the Chair.

Mr. Rodwell.	Mr. Trevelyan.
General Shute.	Mr. Hanbury.
Mr. Cowper-Temple.	Sir Henry Wolff.
Lord Edmond Fitzmaurice.	Sir William Vernon Harcourt.

Postponed Clause 6, amended by inserting after line 35 the words "Provided also as respects the lands in this section mentioned, that in cutting timber or trees for improving the woods, or for sale, care shall be taken to maintain the picturesque character of the ground, and not wholly to level or clear the woods, but to leave from time to time a sufficient number of the most ornamental trees; and to keep the woods replenished from time to time by protecting the self-sown plants, or by planting trees in the vacant spaces, having regard to the ornamental as well as the profitable use of the ground"—(Sir *William Vernon Harcourt.*)—Question, That this Clause, as amended, stand part of the Bill,"—put, and *agreed to.*

Postponed Clause 7, amended, and *agreed to.*

Postponed Clause 8, amended by striking out the words "so far as is practicable," and adding at the end thereof the words "and wood shall be provided for the satisfaction of fuel rights, without the sacrifice of ornamental timber,"—(Sir *William Vernon Harcourt.*) —Question, That this Clause, as amended, stand part of the Bill—put, and *agreed to.*

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New Clause. "Saving rights to dues on the part of the Crown"—(Mr. *William Henry Smith*),—brought up, read first and second time, and *added.*

Schedule 1.—Amendments made.—Amendment proposed to add at the end thereof the words "the contributions in this Schedule mentioned are independent of any dues or sums payable to the Crown"—(Mr. *William Henry Smith*).—Question, That those words be there added—put, and *agreed to.*—Schedule, as amended, *agreed to.*

Other Schedules *agreed to*, with Amendments.

Preamble *agreed to.*

Bill, as amended, to be *reported.*

Minutes of Proceedings to be *printed.*

Ordered, To Report.

REPORT

FROM THE

SELECT COMMITTEE

ON THE

NEW FOREST BILL;

WITH THE

PROCEEDINGS OF THE COMMITTEE

Ordered, by The House of Commons, *to be Printed,*
22 *June* 1877.

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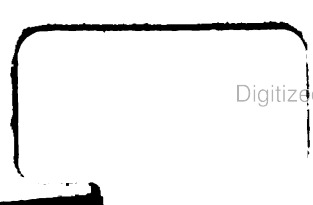

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